679

THE MONTHLY

Review

Official Organ of the American Electroplaters' Society
A Society for the Advancement of the Science of Electroplating

JANUARY • • • 1944

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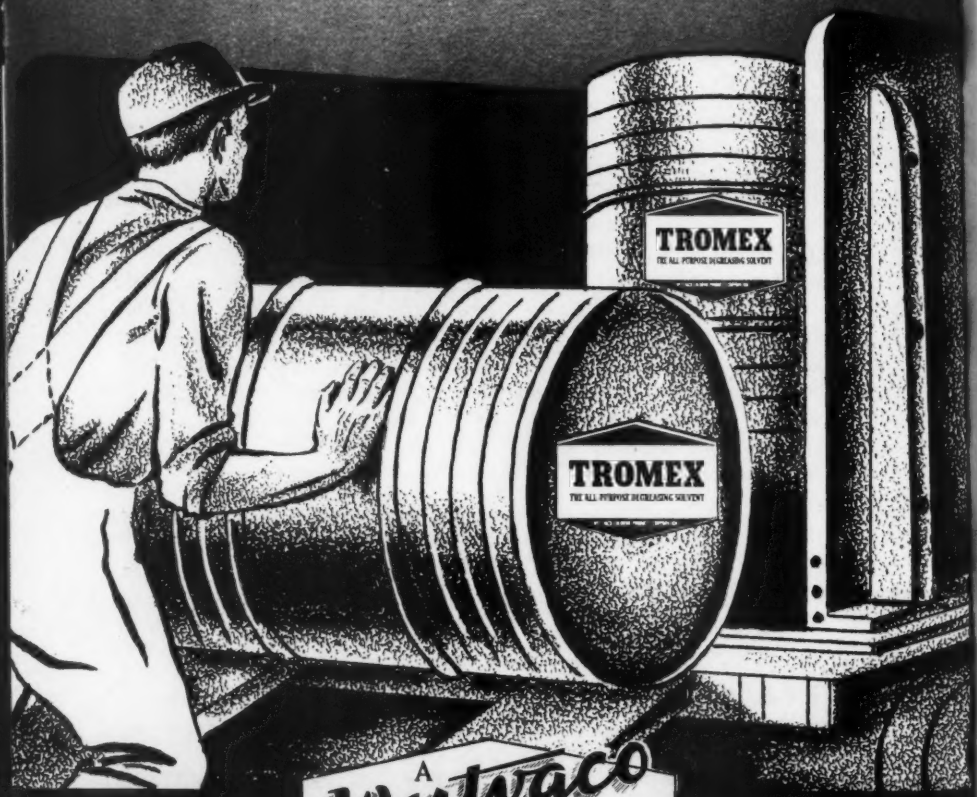

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THE MONTHLY

Review

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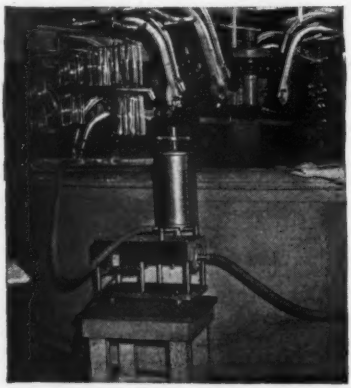

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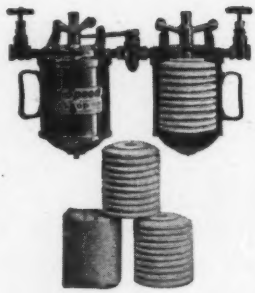

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A MESSAGE FROM THE SUPREME PRESIDENT

GEORGE WAGNER

With the passing of December the year 1943 has taken its place in history along with all the other years which have preceded it but the accomplishments which were achieved were far beyond all expectations.

The American Electroplaters Society and everyone connected with the Society is doing his share for bringing about the Victory and Peace for which so many sacrifices are being made. War Bonds are a means to supply our fighting forces with the necessary implements to secure this Victory and many of our Branches have been buying Bonds regularly. I urge every Branch to invest all of their surplus funds in War Bonds, there is no safer investment.

Our third war time Christmas has passed and although a great deal of the holiday spirit was missing we still retain the thoughts that our democratic way of living will always reign supreme and that sooner or later we will again be able to celebrate Christmas with our loved ones at home. There is hardly a family in this Country that has not been affected by the sorrows of farewells and departures of some of their dear ones, but, when we stop to think of the tremendous hardship and sufferings of the people in battle-scarred Europe and other parts of this world, we should rejoice that we have been untouched by these horrors and that we still exercise our rights as a free people.

During 1943 our Society has continued to grow and with 3,088 members we reach a new high. We have an increased challenge in 1944 both for continued membership gain and enlargement of our scope of service.

Our magazine, *The Monthly Review*, has grown in stature and vitality. Each month new advertisers recognize the importance of the official organ as an effective medium. The *Review*—your magazine—is a publication in which you can be justly proud.

In conclusion I would like to wish each and everyone of you a very Happy and Prosperous New Year.

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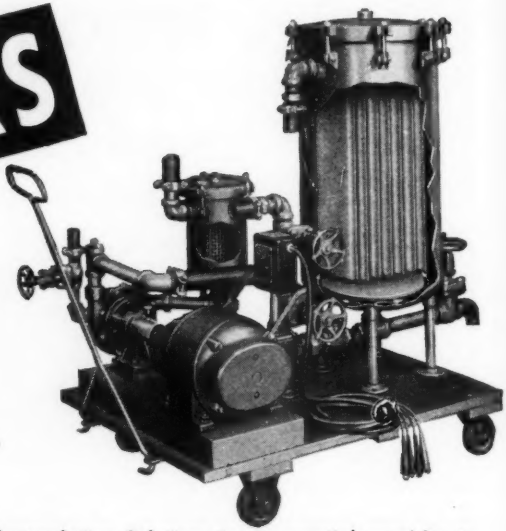

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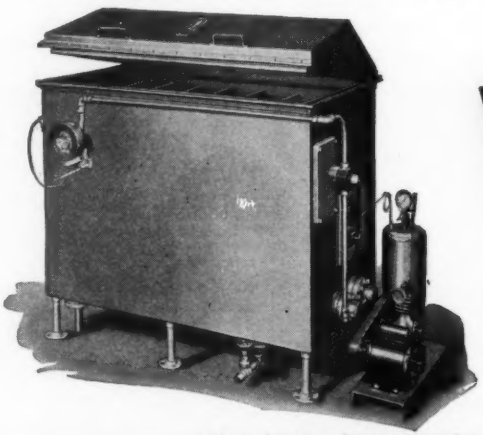

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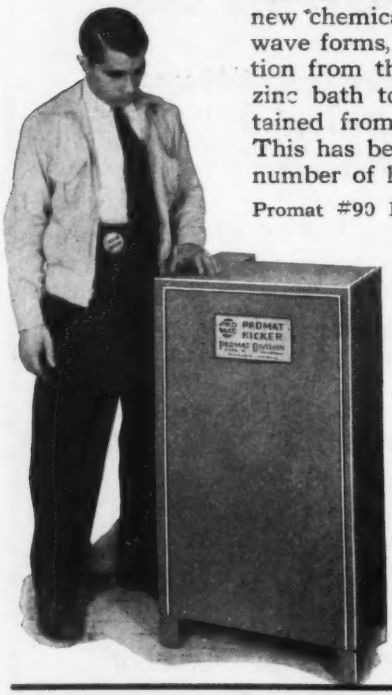

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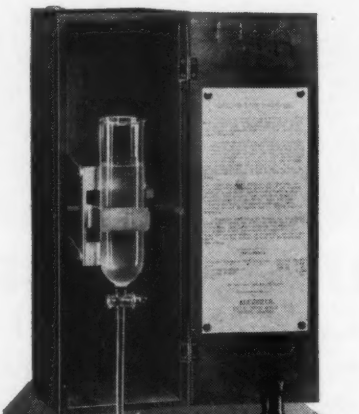

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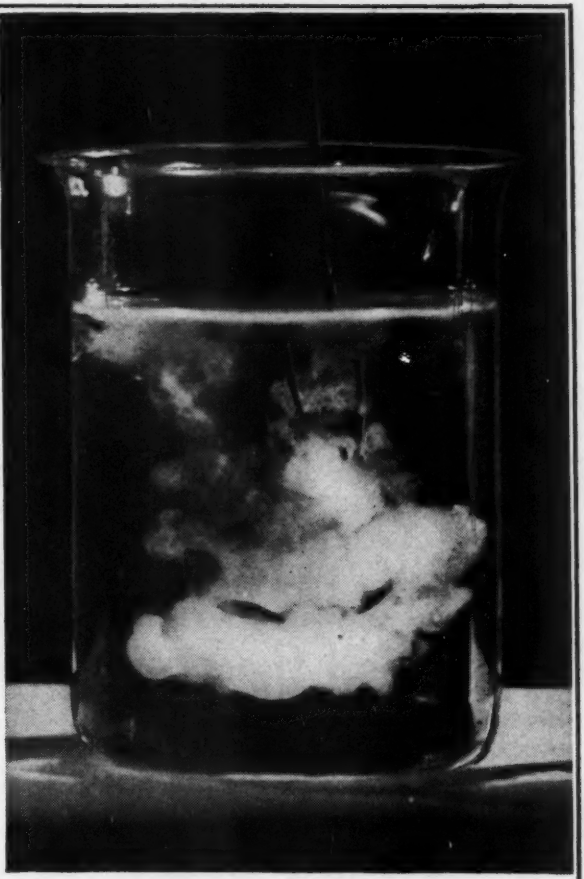

• Enthone Emulsion Cleaner is for *tough* cleaning problems . where you want to clean solid dirt and heavy oil films rapidly. It enables *complete* cleaning . . . the removal of both solid dirt and organic dirt. It means faster, cheaper cleaning. You have a way of preparing work for plating to insure adherent deposits — to make brighter deposits — to make less porous deposits. You can clean active metals such as zinc, aluminum and lead without etching or staining.

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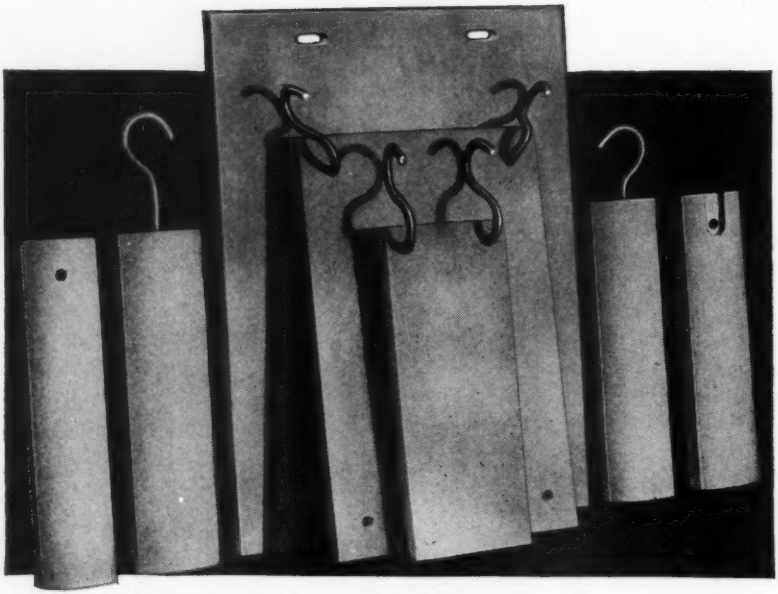

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The Fundamentals of Chemistry for Electroplaters

Part III. The Atomic Structure of Matter

By SAMUEL GLASSTONE, D.Sc., Ph.D.

WHAT IS AN ATOM?

IN order to account for the laws of chemical combination described in the preceding article, John Dalton put forward, in about the year 1805, the idea of the existence of "atoms." He suggested that all matter is made up of extremely small but perfectly definite particles which he called atoms. It was supposed that the atom is the smallest possible particle of an element that still retains the essential chemical properties of that element. Imagine a piece of iron broken up into smaller and smaller pieces; a point will eventually be reached when the breaking up process cannot be continued any further, even in the imagination. The ultimate particles of iron obtained in this manner will be the atoms of the element iron. According to modern views, it is actually possible to disintegrate atoms by the use of special methods; however, the products of the disintegration do not have the properties of the particular element. The atom of iron, for example, can be broken up further by these methods, but then it can no longer be described as iron. It is for this reason that the atom is defined as the smallest conceivable particle of an element which still retains the properties of that element. All the atoms of the same element, such as iron, would presumably be equal in weight and alike one another in every respect. The atoms of different elements would of course be different. That is to say, all atoms of iron would be alike, and all atoms of copper would be alike, but an atom of iron would be different from one of copper.

COMBINATION OF ATOMS BY WHOLE NUMBERS

Since the atoms cannot be divided further, it is impossible for a fractional part of an atom of any element to be involved in a chemical

combination. Consequently, when two or more elements combine with one another to form a compound, a whole number of atoms of one element must unite with whole numbers of atoms of the other elements. It follows, therefore, that combination between atoms can take place only in terms of whole numbers. There are good reasons for stating, for example, that in the compound cupric oxide, referred to in Part II (*Monthly Review*, December, 1943), one atom of copper is united to one atom of oxygen. In the other compound formed by these same two elements, namely cuprous oxide, two atoms of copper are joined to one of oxygen. The atom of any element is represented, in the formula of the compound of which it is a part, by the symbol of that element (Part I, November 1943). The symbol for copper is Cu and that for oxygen is O; hence, cupric oxide has the formula CuO, implying one atom of copper combined with one atom of oxygen. Cuprous oxide, on the other hand, will be represented by the formula Cu_2O, since this contains two atoms of copper to one of oxygen. The formulas of other compounds may be written in a similar manner; thus H_2O represents water, since it is made up of two atoms of hydrogen to one of oxygen. A compound may contain more than two elements; the formula for sulfuric acid, for example, is H_2SO_4, indicating a combination of two atoms of hydrogen, one of sulfur (S), and four of oxygen.

In every compound there must be, in accordance with the statement made previously, an exact whole number of atoms of each element which it contains. These numbers are generally small, viz., one, two, three or four, but not often more, except in some of the complex substances that are formed in living organisms. The fact that small whole numbers of atoms take part in chemical combination provides the explanation of the "law of multiple proportions" described in the preceding article. It was seen there that in the oxides of copper, for example, the weights of the element copper which combined with a fixed weight of oxygen are in the simple proportion of one to two. The reason for this should now be obvious; in cupric oxide there is one atom of copper, while in cuprous oxide there are two such atoms, combined in each case with one atom of oxygen. It is obvious, therefore, that in these compounds the weight of copper, relative to the oxygen, must be twice as great in the latter case as in the former. Other cases of the application of the law of multiple proportions can be accounted for in a similar manner, on the basis of the combination of atoms in terms of small whole numbers.

ATOMIC WEIGHTS

According to the theory of atoms, as outlined above, the atoms of a given element will all have a definite weight, and this weight will presumably differ from one element to another. By the use of various methods the actual weights of the atoms have been calculated, but these weights are so extremely small that they are very inconvenient for general use. For example, to express the weight in grams of the heaviest known atoms, those of the element uranium, would require a decimal point followed by twenty-one zeros before coming to a significant figure. In any event, chemists have long realized that it is not necessary to know the actual weights of the atoms; all that is necessary is to know the weights relative to one another, or to the weight of any particular atom. In earlier studies, the weights of atoms were referred to that of hydrogen, the lightest atom known; in other words, the weight of the atom of hydrogen was taken as exactly one unit, and the weights of other atoms were expressed in terms of this unit. For a number of reasons, it is the practice in modern work to calculate the weights of atoms in terms of the weight of the oxygen atom, the latter being taken as 16.000 units. On this basis the weight of the hydrogen atom is 1.008; the difference from unity is insignificant for many purposes, but it is important in other respects. The weight of an atom or, more correctly, its relative weight, expressed in this manner, is known as its "atomic weight."

The methods used for the determination of these so-called atomic weights will be described in a later article, but for the present the results may be anticipated; the atomic weights of a number of common elements, together with their symbols, are given below. The elements chosen are those that are of direct interest to electroplating practice. It should be emphasized again that atomic weights are relative in character, but this is no serious handicap to their general use; it simply means that instead of using grams or ounces to express the actual weights of atoms, they are stated in terms of a more convenient unit of weight, namely that of another atom.

ATOMIC WEIGHTS AND SYMBOLS OF SOME COMMON ELEMENTS

Element	*Symbol*	*At. Wt.*	*Element*	*Symbol*	*At. Wt.*
Aluminum	Al	26.97	Iron	Fe	55.85
Cadmium	Cd	112.41	Lead	Pb	207.2

Carbon	C	12.01	Nickel	Ni	58.69
Chlorine	Cl	35.46	Nitrogen	N	14.01
Chromium	Cr	52.01	Oxygen	O	16.000
Cobalt	Co	58.94	Silver	Ag	107.88
Copper	Cu	63.57	Sodium	Na	23.00
Hydrogen	H	1.008	Zinc	Zn	65.38

CONSTANT COMPOSITION OF COMPOUNDS

Numerous applications of atomic weights will appear in later articles, but one point will be considered here. It was seen above that the compound cupric oxide (CuO) contains one atom of copper and one of oxygen. The atomic weights of these elements are 63.57 and 16.00 respectively; consequently, cupric oxide must contain 63.57 parts by weight of copper to 16.00 parts by weight of oxygen. Adding these together gives 7.957, and so it follows that the percentage of copper in cupric oxide is given by the following calculation:

$$\text{Copper in cupric oxide} = \frac{63.57}{79.57} \times 100 = 79.90\%.$$

Since the weights of the atoms are quite definite, and cupric oxide always contains one atom each of copper and oxygen, it follows that this compound must always contain 79.90 per cent of copper, irrespective of how it is prepared. Exactly the same general conclusion can be reached by considering any other compound. It is consequently a direct result of the atomic theory that every substance should have a perfectly definite composition; this is in fact the law of constant proportions considered in the preceding article. It is seen, therefore, that the experimental law can be accounted for by the concept of indivisible atoms of definite weight which forms the basis of the atomic theory.

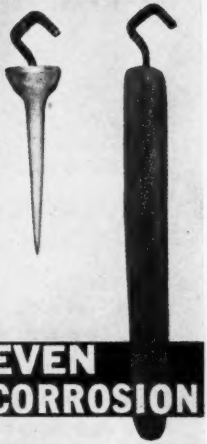
It may be mentioned that atoms are so small that there is no prospect of being able to see them, at the present time. Hence, there is no absolute proof of their existence. Nevertheless, the idea that all matter is made up of atoms provides the most satisfactory way of explaining the fundamental laws of chemical combination. Consequently, the theory of the atomic structure of matter is universally accepted and provides the basis of modern chemistry.

Clean, even deposit

THE REASON

PYROMETRIC CONTROL

THE PROOF



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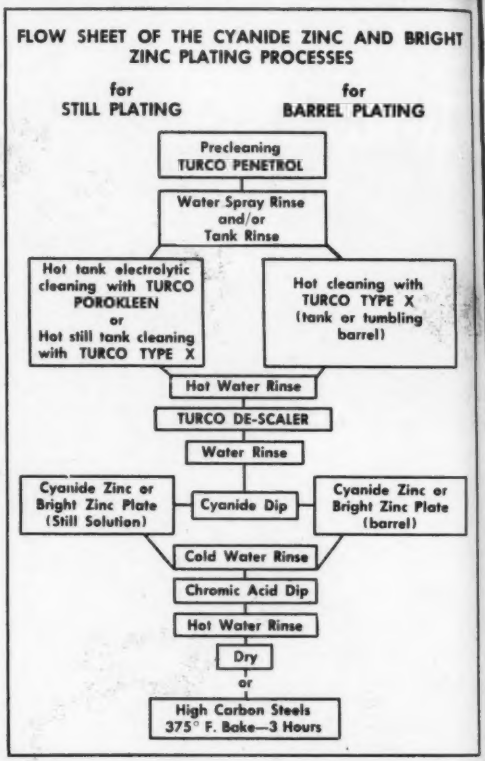
TYPE X

POROKLEEN

PENETROL


FLOW SHEET OF THE CYANIDE ZINC AND BRIGHT ZINC PLATING PROCESSES
for STILL PLATING
for BARREL PLATING
Precleaning TURCO PENETROL
Water Spray Rinse and/or Tank Rinse
Hot tank electrolytic cleaning with TURCO POROKLEEN or Hot still tank cleaning with TURCO TYPE X
Hot cleaning with TURCO TYPE X (tank or tumbling barrel)
Hot Water Rinse
TURCO DE-SCALER
Water Rinse
Cyanide Zinc or Bright Zinc Plate (Still Solution)
Cyanide Dip
Cyanide Zinc or Bright Zinc Plate (barrel)
Cold Water Rinse
Chromic Acid Dip
Hot Water Rinse
Dry
or
High Carbon Steels 375° F. Bake—3 Hours

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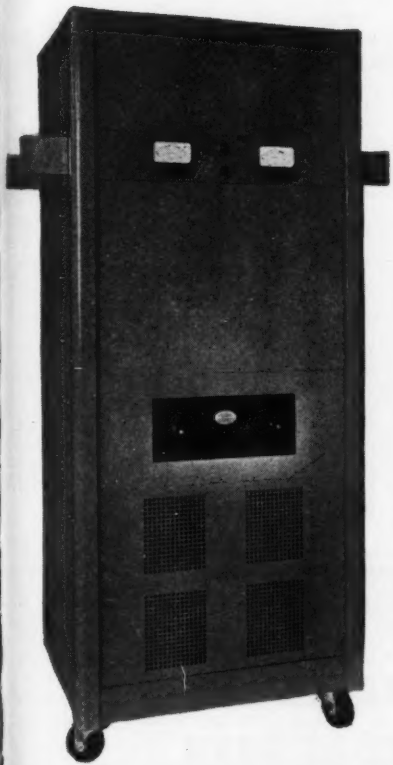

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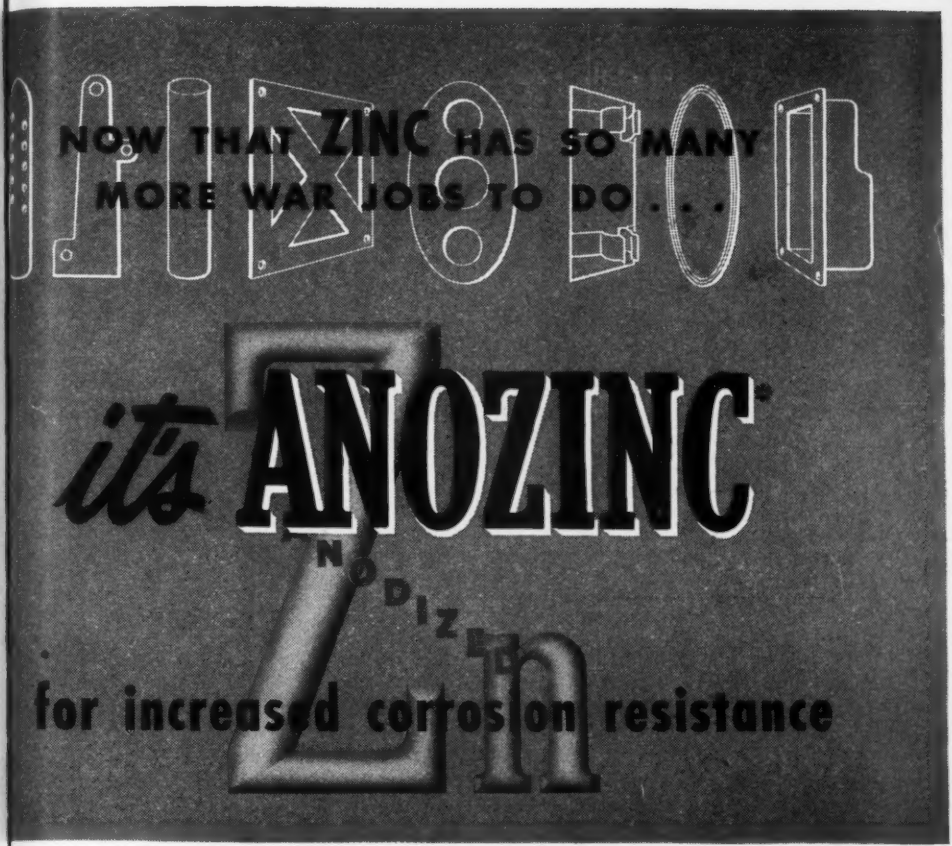

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INDUSTRIAL FINISHES

"Precleaning with Solvent Emulsions"

By

***DR. C. S. LOWE**

Research & Development Department
Pennsylvania Salt Manufacturing Company

*Presented to Rochester Branch Meeting Dec. 8, 1943.

WITHIN the past 15 to 20 years the art of plating metals has evolved into a highly specialized science. Numerous investigations have been reported in the technical literature on practically every important phase of the plating operation proper, from the effect on the finished product of a few parts per million impurities in the plating bath to the most effective use of high current densities.

The closely associated and interlocking technique of metal cleaning has not fared so well. This lack of attention is quite natural in view of the fascination (if you are not engaged in plating for a living) attached to obtaining a bright, shiny coating of metal out of an apparently clear and colorless, brown, or green solution and learning the whys and wherefores of such phenomena. It is not so pleasant though, to have these coatings easily rubbed or peeled off or to find they are shot full of tiny pin holes because the basis metal was inadequately cleaned.

As a technical art the cleaning of metal prior to plating is less developed than plating itself. Doubtless a great many platers can still remember when soda ash was the only material considered for cleaning, regardless of the nature of the foreign matter to be removed. It was the only thing available. Improvements in materials and technique have not centered so much around the quality of the cleaning obtained, as in the development of quicker, less laborious, and more economical methods of cleaning. Solvent emulsion precleaning has been designed to secure, in some measure, these results.

It has been said that the difference between a good and a poor cleaner for a given class of work is the time required to produce a clean surface; in other words, almost any hot alkaline solution will in time remove all contamination from a metal surface. With less and less consideration being given to selection of metal processing compositions for the ease with which they can subsequently be removed, it is

doubtful whether hot alkaline solutions of any concentration will remove some of these materials. Recent innovations in slushing, cutting, and stamping oils, lapping compounds, anti-rust materials, oils used during machine and threading operations, polishing, buffing and drawing compounds, as well as improvised substitutions arising from the shortage of critical materials used in compounding certain of these compositions, have magnified tremendously, the job to be done by the cleaner.

For example, complex organic compounds are now added to cutting oils which combine chemically with the exposed metal surface so that the cutting force does not operate through a metal bond but through a metal-organometal complex bond resulting in much less shear resistance. Frequently a strong acid or solvent treatment is required to break down such metal-organic complexes before an alkali can function effectively. Synthetic resins are being used more and more in binding abrasives to replace materials such as stearic acid or stearin pitch. A softening treatment in a solvent emulsion will greatly assist the action of any alkali in removing this troublesome type of material.

Some types of synthetic resin binders for grinding wheels contain halogen atoms which split off as acids at the grinding line under influence of highly elevated temperatures. Such an acid condition tends to "set" the binder impregnated in the metal, making it still more difficult to remove with alkali.

By far the most significant trend is the ever increasing use of paraffin oils and paraffinic type materials in practically all of the metal processing compositions. Since these are relatively cheap, are readily available, and are very effective for their respective applications, their removal must be given consideration in designing cleaning compositions and techniques. Paraffin oils are relatively inert and contain very little saponifiable material. Hence reliance must be placed for the most part on the emulsifying and solvent characteristics of cleaner ingredients. Solvent emulsion cleaning, followed by 20-30 seconds alkaline electrocleaning has given good service here.

SCOPE OF APPLICATION

Solvent emulsions for use in metal cleaning were developed along in 1933 and 1934 to answer a specific need, viz., elimination of hand scrubbing as one step of the cleaning operation prior to electroplating. They are not considered to be a substitute for alkaline metal cleaners

or for vapor degreasing but rather to supplement them in order that a quality job may be done faster and cheaper. Since the inception of this method of cleaning many new fields of detergent application have opened up, with the war and accompanying shortages of chlorinated solvents accelerating the expansion. However, just as no one complete cleaner is applicable to all metal cleaning problems, so the solvent emulsion cleaner represents no panaces.

TYPES IN USE

Emulsion cleaners are sold either as concentrates or extended with solvents ready for use. If a concentrate is employed, the user dilutes with a grease solvent such as kerosene to an extent largely dependent upon the amount of solvent present in the original mixture. Generally concentrates can not be used satisfactorily unless they are diluted with a solvent according to the manufacturer's recommendations. A common dilution range is 1 part concentrate to 5 to 10 parts kerosene. Other solvents such as safety solvents (these are naphthas or benzines which have a flash point about 100° F. and are sold by most large oil companies). Stoddard solvent, mineral spirits, chlorinated benzene, etc., may be used provided no separation into layers occurs on diluting with the desired amount of solvent. For very difficult jobs, hydrogenated naphthas such as "Solvesso" No. 2 may be found effective.

Federal Specification P-C 576 Compound; Grease-Cleaning, Solvent Emulsion Type, November 6, 1942 further divides the concentrate classification into nonphenolic and phenolic types. The phenolic type is generally considered to be more effective than the nonphenolic; however, the phenolic compound leaves a strong residual odor characteristic of many disinfecting preparations and has greater irritating action when in contact with the skin than the nonphenolic type. This Government specification was intended for use in connection with purchase of such materials for use in the cleaning of automobile engine blocks, either by spraying or immersion, as well as for general cleaning of oily surfaces.

METHODS OF APPLICATION

Three methods of application are recognized:

(1) The work may be sprayed, dipped into or otherwise contacted with the cleaner, without addition of water. If the concentrate form is employed, the desired solvent extender should first be added in the proper proportion. No heat is required. Moderate agitation or move-

ment of the work through the tank will increase solvent action markedly. After allowing the soiled work to remain in contact with the cleaner for one-half to three minutes, depending on the nature of the soil and the thickness of the film, the work is water rinsed. On contact with water a milky emulsion is immediately formed. The major part of the cleaning takes place in the rinse, very little oil or other contamination building up in the solvent cleaner.

Rinsing is preferably accomplished by spraying with hot water, although a cold spray rinse or hose off or rinsing in a continuous overflow tank is satisfactory for some purposes. Weak alkaline solutions are sometimes used effectively for rinsing where heavy accumulations of saponifiable matter must be removed. Rinsing may also be carried out with safety solvent or mineral spirits where emphasis is on oil or grease removal, simultaneously leaving a temporary rust protecting film. A slight film of the extender used always remains on the work and must generally be removed by following with a 20-30 seconds electrolytic alkaline cleaning before entering the pickle prior to plating. This film provides temporary rust protection. A hot spray rinse leaves very little film, particularly where a fairly volatile solvent extender is used; a cold rinse leaves a heavier film providing rust protection over a greater period of time. By proper selection of solvent extender and adequate temperature control of the rinse it is possible to adjust the magnitude of these films to the desired end. For maximum film reduction and no carry over of emulsion into the alkaline cleaner two rinses may be used, a cold rinse followed by a hot rinse.

For this type of application the surfaces to be cleaned should be dry so that an emulsion is not formed on immediate contact with the solvent cleaner. In fact, if the work is slightly warm, solvent penetration will be faster and the minimum time for contact with the solvent emulsion is usually employed.

Where a dip tank is used for the solvent cleaner, precautions should be taken to keep water out as water will cause a certain amount of coagulation and thickening which will prevent penetration of the solvents. A spray rinse should either not be located too close to the dip tank or it should be shielded, particularly when it represents an operation in an automatic machine cycle.

The useful life of such a dip bath is surprisingly long. Both solvent and concentrate are added in the proper ratio from time to time to compensate for drag-out losses. Baths of this type have been known

to run for six or eight months without dumping. Some manufacturers advocate using a tank having a "V" or sloping bottom and an outlet. Periodically, depending upon the degree of use, the cleaner is allowed to stand and the settled dirt drained off through the outlet. Or the clear portion, on settling, may be siphoned or decanted off, the sludge removed and the clear cleaner put back in the tank. Operating in this manner the cleaner should never have to be discarded. The sludge removed has been found usful in degreasing floors and garage equipment.

Whether this method of application will be found economical and adequate will depend somewhat on the shape of the work. If there are too many wells or pockets, dragout may be considerable and rinsing, even with a pressure spray may be difficult. Small parts should be rinsed in a tumbling barrel. In most instances where the shape of the work lends itself to good drainage, precleaning by this method offers speed plus removal of all surface dirt, including embedded solid particles of all kinds, without need for hand cleaning operations.

(2) The dilute material, whether it is purchased in dilute form or as the concentrate and diluted by the consumer, is added to water forming an emulsion. This emulsion is the cleaning medium used in a pressure spray washing machine. Temperatures in the range of 140-190° F. are generally employed. Further flexibility is available in this method of application if the consumer employs the concentrate, since not only the concentration of the mixed material in water can be varied, but also the amount of solvent added to the concentrate. Recommended dilutions vary according to the nature of the soil and the amount present. For solvent-soluble soils, maximum solvent dilutions are desirable; for the removal of solid particles as abrasives from buffing and polishing compounds or carbon smut, emphasis is placed on emulsification and lower solvent dilutions are required. Water dilutions will vary from one part solvent preparation to 40 parts water up to as high as 1000 parts water. The most useful range is probably from 50 to 100 parts water.

The emulsion drains fairly well but not as freely as in the case of many alkaline cleaners. Addition of small amounts ($\frac{1}{16}$ to $\frac{1}{8}$ oz./gal.) of proprietary alkaline cleaners will frequently improve this condition. It is possible to plate metals such as cadmium or zinc over such treated surfaces without further cleaning. With this small addition of alkali a slight rust-inhibitive film still remains on the work. These films have

been found not to interfere with finishing operations requiring physical cleanliness, such as painting or enameling where high solvency, low boiling, quick drying thinners are used in the paint or enamel formulations.

Where the concentrate is purchased, the proper amount of solvent extender and emulsifying base may be added separately to the washer, thorough mixing generally being accomplished by the pump circulation. Freshly prepared emulsions occasionally will foam excessively where relatively large amounts of the concentrate are added. Boiling for 15 to 20 minutes before starting the pump will decrease this tendency. After a few hours operation foaming stops.

(3) The emulsion as prepared in water may also be used in soak tank operations with or without addition of alkali. High temperatures are desirable. The amount of solvent extender added in this type of application should be kept low, as excessive amounts will tend to separate out as a surface layer and be lost in the overflow. This is the least effective method of application both from a practical and theoretical standpoint.

LABORATORY METHODS OF TESTING

Three types of soiled surfaces have been found useful in laboratory evaluation tests: (1) A corrugated aluminum panel smeared over with a paste prepared with a lubricating oil and talcum powder and baked at a temperature of 300° F. for three hours.

(2) Ground glass plates soiled by rubbing dry carbon black of 28 millimicron average particle size into the surface with a spatula. The carbon can also be contacted with a carbontetrachloride solution of mineral or lubricating oil, removed and solvent allowed to evaporate before applying to the glass. Transmission of light through the glass before and after cleaning can be followed photometrically.

(3) Cold rolled steel panels are soiled on a buffing wheel with the composition under test.

Although methods (2) and (3) make no attempt to control the pressure at which the dirt is forced into the surface, by using care sufficiently uniform samples have been prepared to give ample indication as to whether we were using a cleaning procedure and emulsion adequate for the job.

Where mineral oils are involved, examination under ultraviolet light before and after cleaning will assist in determining the absence of

oil. The film of solvent left under certain cleaning conditions does not generally interfere with this method of comparison. Fluorescent dyes can also be incorporated in the soiling medium to follow the removal of the soil by ultraviolet light.

THEORETICAL ASPECTS

The exact mechanism of solvent emulsion cleaning is not completely understood. The preparations consist of soaps, blending agents and hydrocarbon or organic grease solvents. The blending agents are soluble in both organic solvents and water. Their function is to hold water and solvent together in emulsified form and to disperse soap in solvent. An appreciable amount of water is present which is either held as water-in-oil emulsion, or is dissolved in true solution as the result of the solubilizing effect of the soap. Behavior on dilution with hydrocarbons indicates colloidal forces are predominating. On kerosene dilution above certain limits varying with the nature of the soap and blending agents, flocculent precipitates are formed which are for the most part soap. On further dilution of some preparations these precipitates will clear up and the mixture will thicken measurably. These phenomena would not be expected if we were dealing with true solutions.

It is also possible that the concentrated detergent, applied as in the dip-rinse method, functions as a true solvent. If this is the case it has the advantage over the use of a solvent liquid such as trichlorethylene, that the solvent is miscible with water and preserves its solvent action on dilution with water, so that water can be used as the rinsing liquid.

When objects treated by the dip-rinse method of application first contact water, relatively large masses of oil and water appear to be in very active movement, probably due to the formation of oriented films of soap around the oil globules. The solvent present, having previously penetrated and partially dissolved grease and oil surrounding solid particles, becomes encased in these films. Solid particles migrate to the interfaces under the influence of surface tension forces. The more or less turbulent conditions occurring during this rearrangement and alignment of molecules tend to loosen inert material, facilitating ease with which it can be flushed off.

The nature of the inert solids present will determine whether the solvents will wet-out these and thus further aid in dislodging them from the surface under pressure of the water rinse. For example when finely

divided red lead is shaken with chloroform and water, the chloroform droplets become coated with red lead, and are kept emulsified in the water phase. The lead is preferentially wetted by water more than by chloroform with the consequence that water displaces chloroform and forms an aqueous film around the particles of the solid, which tend to remain in the aqueous phase. These particles, protected by their aqueous film, migrate to the interface existing between droplets of chloroform and the continuous water phase, and thus have a certain tendency to stabilize the emulsion of chloroform and water formed mechanically by shaking.

Carbon black particles are preferentially wetted by hydrocarbon solvents so that they tend to accumulate in the oil phase, which is the continuous phase during the soaking period of the dip-rinse method of application. Burnt umber particles (a form of iron oxide), on the other hand, are more strongly wetted by water and accumulate in the water phase. Prussian blue particles have contact angles of 90° with both hydrocarbon solvent and water and are as a consequence wetted by either solvent or water and readily removed.

By application of first a grease or organic solvent as the continuous phase, followed by inversion to a continuous water phase, opportunity is afforded for all types of particles to become thoroughly wet, regardless of contact angles, and their release from binding forces is assured.

When applied to the work after forming the emulsion in water, as in a power washer or soak tank operation, the action is somewhat different and more limited. The emulsion having been formed, reliance must be placed on release of solvent from agglomerates of oil-in-water droplets to dissolve and penetrate the soil, and migration of solid particles to the interface formed between the droplets and water as the continuous phase. This release is greatly assisted by the force with which the solvent laden droplets hit the soiled work in the spray washer. Temperature is a factor in this release, the higher the temperature, the greater the break down. In a soak tank where there is no comparable force to bring about such a release, cleaning results are not so good.

Hydrocarbon solvent escaping from the agglomerates as the result of increased temperature rises to the top as a surface layer and has very little contact with immersed work. As the work is withdrawn from the bath it is pulled through this layer of solvent plus some dissolved oil leaving a relatively thick oil film which is definitely undesirable for most purposes.

Further addition of alkali to the power washer is often advantageous particularly where there is a goodly amount of saponifiable soil. Chemical reactions occurring during saponification may theoretically take place in the fat phase, in the aqueous phase, or at the interface existing between fat and aqueous phase. Experiments have proved that saponification takes place in the dineric interface. By extending this interface through the use of emulsifying agents better contact is secured between alkali and fat with the result that more fat or grease is saponified at a much more rapid rate. For example addition of 10% emulsifying agent to cottonseed oil permits 100% saponification with 2N caustic soda. Without the addition of emulsifying agent only 59% saponification takes place.

WHY USE SOLVENT EMULSIONS

The complexity of the problem of cleaning is readily brought home when we try to wash our hands soiled with automobile grease or dirt accumulated from a plumbing job. With soap alone it is almost impossible to get the hands clean, but if they are first washed with a small amount of a low viscosity oil, and then with a soap solution, the grease comes off easily. The particles of carbon and graphite are embedded in the pores and the skin is coated with grease. The tendency of the soap solution to separate these from the skin is not great enough to be effective no matter how stable the dispersion may be once it is formed. The solvent oil dissolves the grease and lowers its viscosity. It penetrates the pores, where it wets the carbon particles preferentially, and loosens them; hence when the soap solution is applied it can exert its full emulsifying effect.

In an analogous manner precleaning metals with solvent emulsions takes the "cling" out of the soil, as it has been expressed, leaving the solid particles coated with soap. In this form they are readily deflocculated and carried away with the force of the water, leaving a physically clean surface.

Quality plating must have a chemically clean surface. This is an essential prerequisite. To obtain this, it is more practical, less costly, and sometimes the only way out, to first get a physically clean surface before resorting to chemical or solvent action, rather than attempt to do a perfect cleaning job in one all-conclusive step. A physically clean surface implies the absence of gross surface dirt which can be wiped, brushed, or secured off. Such a surface is not free from "waterbreak"

and is not clean in the sense that microscopic surface fissures or irregularities are thoroughly freed of oil or grease. Adequate precleaning, in removing heavy accumulations of stubbornly held solid particles embedded in matrices of grease and oil makes the final cleaning comparatively easy.

Precleaning should accomplish the removal of pigments and abrasives, grease, oil, smut, and such agents as tripoli, crocus, lithopone, lime, emery, etc., without manual scrubbing and brushing. In the plating departments of large manufacturing plants where types of foreign matter remain relatively constant from unit to unit, effective procedures and cycles of cleaning are readily established for certain classes of soiled work, and the value of precleaning both on a cost and performance basis is easily determined. Adjustments of temperature, concentration, time, in alkaline cleaning solutions are less frequently necessary as changes are made in lubricants, coolants, polishing compounds, etc., when precleaning is employed. For the job plater, on the other hand, each batch of material received constitutes a special cleaning problem. Application of precleaning here tends to minimize changes in cleaning techniques and throw more of the jobs received into a normal cleaning pattern.

Alkaline electrolytic cleaning baths are not loaded with floating oil and suspended dirt where this heavy contamination is removed in precleaning. Consequently such solutions require less frequent replacement. The time involved is shortened markedly, thus speeding up the cycle and saving current costs. This is of particular significance where high current density anodic cleaning methods are being used.

Adsorbed soap films arising from overworked alkaline cleaners, particularly noticeable with alloys of zinc and copper electrolytically cleaned, are minimized. Such films are frequently made use of by the electroplater for drying plated work and brass without staining. Dipping cleaned or plated work in dilute soap solutions and immersing in hot water leaves a slight soap film which causes the water to drain off very fast preventing water spots and stains. Although this film is desirable here, it should not be present on work ready for pickling or plating. Work filmed over with soap frequently appears perfectly clean and gives no waterbreak until contacting the pickle. Here the soap is broken down releasing fatty acid which results in definite waterbreaks and poor plate adherence.

Vapor degreasing with tri or perchlorethylene or carbontetrachlor-

ide removes efficiently oils, waxes, and grease soluble in the solvents. Solid particles present remain untouched and are generally more difficult to remove by scrubbing or hand-wiping once the lubricating agents have been dissolved away. Application of a solvent containing emulsifying agent coats the particles with a soap film permitting their easy removal by flushing with water. In addition to accomplishing a better cleaning job with respect to removal of solid particles, the operating cost, aside from solvent replacement costs, is much less since no cooling water for condensing the solvent is required. Also if the cold dip-rinse method of application is employed, no steam is required for vaporizing solvent.

The flammability of these mixtures when used as in the dip-rinse method will be essentially that of the solvent employed. Addition of 1 to 5 to 1 to 10 parts of concentrate will generally raise the flash point a few degrees but not appreciably. A concentrate having a flash point of 235° F. when diluted 1 to 10 with kerosene having a flash point of 127° F. will flash around 134° F. When used as an emulsion in a power washer (after mixing with water) the amount of water vapor present is so great in comparison with solvent vapor that there is no flash point. In other words the water emulsion is non-inflammable so long as no separation of a solvent layer takes place.

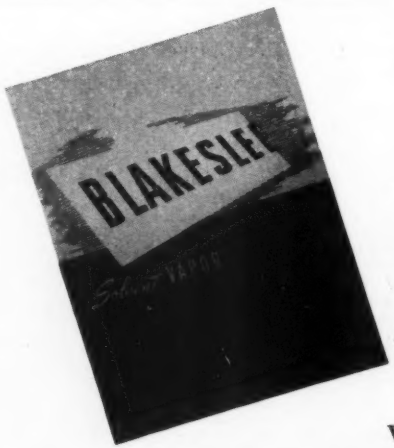
Occasionally kerosene or even gasoline is used in miscellaneous cleaning operations such as removing grease from motors and the solvent accumulates in drains or sand traps. If mixed with emulsion base, faster cleaning is obtained and on contacting water in the disposal system the flammable solvent is instantly emulsified eliminating fire hazard.

Perhaps the outstanding advantage in using solvent emulsions as precleaners is the great flexibility offered in the choice of solvent and control of degree of alkalinity. The concentrate can be prepared with varying degrees of alkalinity making possible treatment of soft and easily etched metals. Emulsion cleaners have no action on active metals such as zinc, aluminum, lead, tin, copper, and brass. Their use as precleaners permits a much shorter immersion in the alkaline cleaner with almost no attack. This is of particular importance in the cleaning of zinc base die castings where it has been definitely proved that overcleaning and overpickling result in blistered or peeled copper plate. As a matter of fact emulsions can be prepared which are neutral or even acid in character, although the latter type are much more difficult

to prepare and are more costly.

Control of the emulsion in spray washer or soak tank is based on observation of emulsion quality or stability and titration for alkalinity. A sample is taken from a turbulent section of the washer. After standing a few minutes, it is examined for separation into layers. If it appears thin and the oils are collecting on top forming a surface layer, the bath needs recharging. A daily check on this basis, compared with similar observations made on a freshly prepared solution, together with titration values, affords adequate shop control.

In summary, precleaning with solvent emulsions removes solid and organic dirt contributing to dullness of "bright" coatings, to pitting, peeling, and porosity of electrodeposits. Precleaning speeds up the whole plating cycle by reducing the time required in conventional cleaning operations and by lowering frequency of rejects. Alkaline cleaners, unless used anodically at very high current densities, do not remove solid dirt. Vapor cleaning is also deficient in this respect. By introduction of precleaning into the cycle, removing both solid and organic dirt, a quality job is produced faster and cheaper.



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G. S. BLAKESLEE & CO.

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1944 EXHIBIT

By
WALTER PINNER
Exhibit Chairman

SOMETHING new is in the making for the Cleveland Convention which we believe will be interesting, amusing as well as educational for all in attendance. Do you remember the time you called on your friend Joe Doakes and he proudly displayed to you an unusual collection of sea shells he picked up on the Florida Coast? And then, he called on you and you showed him a baseball autograph by Babe Ruth. And then you and Joe Doakes called on Horace Doolot and he showed both of you a collection of unusual crystals grown in his laboratory. Now, if you and Joe Doakes and Horace Doolot had called on Bob Diggemup he would have shown you a double carrot shaped like Venus. The fun is now in the making. Who has a golf ball that he made a hole in one with? Do you have the hole itself?

Your friends and our friends are interested in seeing these things we so proudly display. The trouble is that your friends do not visit our homes and our friends do not call on your homes. Now, however, the Cleveland Convention exhibit hall can be temporarily all of our homes, and we will safeguard these possessions of yours and ours by having them in locked glass cases.

You are going to hear more of this in future issues of the "*Review*." Meanwhile who has

(1) The lantern the cow kicked over in Chicago, or
(2) Cinderella's slipper, or
(3) A list of blonde Cleveland telephone numbers, or
(4) Much more seriously, a curiously manufactured product, or
(5) A collection of minerals or crystals, or
(6) A Russian Cossack hat.

The scheme proposed above has the prior approval of the officers and a number of members of our society. Fun and interest are in the making. Let's have your comments. Let's have your cooperation. Let's make the exhibit hall the center of attraction it used to be when we could show our plated ware. There's more to come in future issues.

Much Ado About Nothing

Studying the business Sessions of the last Convention I observed that the Amendment suggesting changing the name of the Society, as well as others to enlarge the scope of our Society, is to be an order of business at the next Convention, and that Montreal Branch is to sponsor Amendments to that end meanwhile, which I presume, will be submitted to the Branches in due course.

I wish to refer to the address by Mr. John Feeley upon this subject, and endeavor to point out certain phases of the present structure of the Society which, from my point of view at least, seem to have been overlooked or ignored.

Retaining the present name of the Society is not essentially any detriment to its progress, the first part of the name, American, is just as applicable to Canada as it is to the U. S. A. After all its all North America, using the term International would be no advantage, the Society will progress exactly in accordance with the zeal and efforts its officers and members put into it, regardless of any high sounding name, nothing else will enhance its sphere of influence or growth.

While all of what is contained in paragraph 7 may be true, as relating to International affairs, yet it must be conceded that we are not going to change the name of the U. S. A., the British Empire, or anything else. In other words the intention is not to gather all of our Allies together, drop all present titles, and call ourselves the Allied or United Nation of the World, but it is the general idea to work towards a better World, within the present framework of all, the same is true of our Society, namely to work for its progress within its present structure.

If we consider changing from overalls to business suits, nothing is changed in what is inside, the same man is still there. Embelishments, no matter of what sort, will not create any change. It still remains a fact that any improvement or progress is totally dependent upon the man himself. The logic herein applies to everybody in the Society.

The argument advanced in paragraph 13 to retain a member in the Active Class forever, regardless of any achievement by him appears unsound, as well as an injustice to him. If by his own efforts, good work, and intelligence he is selected as a Salesman in any Supply Lines, that is a promotion and he should, in the natural course of such event, be advanced in his Classification as now provided by the Society. This

does not mean that his value to the Society is any less, on the contrary, he is infinitely more so, since he is not denied full participation in the work of his Branch, promote its welfare on the outside, as a matter of record most of the growth and progress of the Society can well be accorded to the Associate Class, hence why deny this privilege to any one sufficiently ambitious to attain it.

The example cited in paragraph 14 wherein a First Vice President was disqualified and had to resign for that reason is of no vital consequence. He was merely complying with the Law of the Society, which was right and proper. No man who is a good member would want to do otherwise. Furthermore no man is so important but what he can be replaced, and I am sure the record will show that the Society suffered no loss, it was merely a function within the structure of the Society. Changing the Law to obviate such a situation would be no improvement, we change officers annually, regardless of their records, for better or worse, hence why tear the structure apart merely because an Officer changes his status of classification.

There is no basis in fact for the contention in paragraph 15 in effect, that his learning is lost if an Active member automatically becomes an Associate Member. My good friend Mr. Feeley himself is in the Honorary Class, and I am sure that his learning and value to his Branch, or the Society as a whole is not lost, which is an obvious contradiction of his own contention.

If all of the information in paragraph 16 is entirely correct all of the campaign which has been carried on for the proposed changes in the framework of the Society falls flat, and cannot be defended on any grounds whatever.

Associate Member. The provisions outlined in paragraph 17 relating to this Class of membership already exist, in fact, I think Section 3 of Article 11 as now written is even more liberal, and should not be changed.

Delegates to Annual Convention. The suggestion embodied in paragraph 20 is, in my opinion, the most valuable, and the only important change which should be made, the Associate Class I feel are entitled to this recognition.

Sincerely yours,

ERNEST LAMOUREUX

In Answer To Much Ado About Nothing

Brother Members:

In this issue you will find an article by Mr. Ernest Lamoureux commenting on my remarks made at the 1943 Convention.

If you were not present when they were made, and up to the present time have not seen or heard the business report of the Convention read at one of your meetings, I trust you will request your Branch President to have it done at your first meeting.

I am sure that very few of our members will be able to agree with Mr. Lamoureux' interpretation of the feelings of the members present when they were offered for the consideration of the Society as a whole.

You will note from the report that the delegates present as a whole felt that the suggestion contained matter of great importance; so much so that they requested the writer to have them submitted in a Constitutional form for presentation to the 1944 Convention.

Montreal Branch has accepted this honor and has appointed a Committee to draft the suggestions so that they can be offered as amendments to the Constitution at our next Convention. These will be ready for the April Review; also copies will be sent to each Branch.

You will note that I have refrained from going into Mr. Lamoureux' letter, paragraph by paragraph, as I feel this is neither the time nor place.

The whole question is a matter for the membership to discuss at their Branch meetings although no final decision can be reached—owing to the fact that the report as it appears in the business transactions of the Convention were merely suggestions made by the writer and not offered as an amendment to the Constitution.

On receipt of the official amendment as offered by Montreal Branch, we would ask you to discuss this thoroughly, bearing in mind that what we are after is progress. If however this does not meet with your approval, it is suggested that your Branch prepare such an amendment to the Constitution, as you are all aware that for some years past the present Constitution does not cover conditions as they exist today.

Yours very truly,

JOHN H. FEELEY

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The MODERN BLACK FINISH for STEEL

Around the world — on every front — steel products of war are finished with Pentrate. Many types of weapons, steel propeller blades, engine parts, precision instruments and a multitude of other items have this protective Pentrating finish.

Designers and engineers with an eye to post war products have included Pentrate in the plans for the future.

Pentrate gives a deep black durable rust resistant finish to steel. There is an actual penetration with positively no size change. Bearing manufacturers have found the friction reducing quality of Pentrated surfaces advantageous.

Send for Pentrate catalog.

HEATBATH Corporation
SPRINGFIELD, MASSACHUSETTS

*PATENTED

Post-War Planning

Whether the War were to end tomorrow or be carried on for a more indefinite period, make your plans now to attend the 32nd Annual Conference on Electro deposition and Metal Finishing to be held by our Society in Cleveland—June 12, 13, 14, 1944.

The Cleveland Branch membership will be your hosts and are now perfecting plans for your education and comfort during your stay in Cleveland.

It is our intention to keep you informed from month to month on the developments relative to the Educational Programs, Hotel reservations and transportation recommendations.

Since our primary objective is the winning of this war in as short a time as possible—it is the patriotic duty of all metal finishing executives to avail themselves of every opportunity to increase production and reduce the cost of same.

Cleveland Branch in our 32nd Annual Conference is presenting such an opportunity through the timely papers to be presented and the informal discussions of your problems with kindred souls.

It is not too late to include in your New Year's resolutions the determination to attend the Cleveland Conference. Keep that resolution—we plan to help through our monthly reminders.

Best wishes from Cleveland for the success in all your plans for 1944.

PACKS AUTHORITY

The removal of drawing and fabricating compounds, machining oils, carbon smut — is often a *stubborn* operation. It bows only to *cleaning with authority.*

Wyandotte Metal Cleaners go at a job that way—with authority! However mean the job of metal cleaning or degreasing that's put up to Wyandotte—the job gets *done,* and in jig-time! For Wyandotte Cleaners are *specialized* to fit the demands of any job.

War production can't lag for a second because of metal cleaning difficulties. And wherever used, Wyandotte has seen to it that such "hitch-hikers" *never even get a start.*

Your best friend in helping you meet any cleaning problem that may arise is the Wyandotte Service Engineer. Thousands have learned that he, and the Wyandotte compound he specifies, have what it takes. Find out for yourself—today.

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Sixth Annual Educational Session and Dinner Dance

American Electroplaters' Society

Grand Rapids Branch

January 15, 1944

PANTLIND HOTEL

Grand Rapids, Michigan

EDUCATIONAL SESSION AT 2:00 P. M.

Open to All — No Charge for Admission

SPEAKERS AND THEIR SUBJECTS

"ADDITION AGENTS IN ELECTROPLATING" by Dr. F. C. Mathers, Dept. of Chemistry, Indiana University, Bloomington, Indiana.

"NEW USES OF CATION AND OF ANION EXCHANGE MEDIUM IN THE PLATING INDUSTRY" by W. S. Morrison, Illinois Water Treatment Company, Rockford, Illinois.

"ELECTROGALVANIZING OF STRIP STEEL" by Ernest H. Lyons, Jr., The Meaker Company, Chicago, Illinois.

Session Chairman: CLEVE NIXON, Ternstedt Mfg. Company, Detroit, Mich.

DINNER SERVED AT 7:00 P. M. — MAIN BALLROOM

and the Best Floor Show of the Year

DANCING FROM 10:00 ON . . .

An estimated 500 will attend

This is the party of the year. Come Early — Come Late — *But Come*

ALL YOUR FRIENDS WILL BE THERE

Make Your Reservation Now

TICKETS: $3.50

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AN OLD NAME WITH NEW PRODUCTS
List these names for your Metal Cleaning Reference. These products typify the Finest in Metal Cleaning Technique.
BRISTOL
CONNECTICUT
KEMTEX
FERRODEX

LEA

MOLDING an idler crank in rag-filled Bakelite left a heavy flash at the parting lines — and dumped a stiff production problem right in the lap of American Insulator Corporation, New Freedom, Penna.

Formerly, each part was hand-filed to remove flash and the resulting seam was buffed. It was a slow process, so they searched for and found a better and faster way.

> *"The laborious process was eliminated by the use of a LEA COMPOUND operation. LEA COMPOUND is used on a soft cloth buff 7" in diameter, running at a speed of 2350 R.P.M. This change to LEA COMPOUND has permitted a definite SAVING in COST and TIME, and PRODUCES A BETTER FINISHED APPEARANCE than was possible by the hand-filing method."*

To meet other war production needs, LEA engineers have developed many new techniques. For example, by the use of various types of cone-shaped bobs, operating on a tapered spindle, countersunk holes

Compound Eliminates Hand Filing

reports

American Insulator Corporation*

*Photographs and data courtesy American Insulator Corporation.

of varying diameters can be burred effectively without filling threads or holes with foreign material.

Write LEA in detail about your burring, polishing, or buffing problem. Invite a LEA engineer to call for a consultation. He will gladly help you solve your problem.

THE LEA MANUFACTURING CO.

Waterbury 86, Conn.

Burring, Buffing and Polishing . . . Specialists in the Development of Production Methods and Compositions

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INDUSTRY NEWS

BALTIMORE-WASHINGTON ANNUAL MEETING

The Baltimore-Washington Branch will hold its annual meeting at the Lee Sheraton Hotel, 15th & L Streets, N.W., Washington, D.C., on Saturday, February 5th, 1944. The Educational Session will begin at 4:00 P.M. Papers will be presented by the following speakers:

Dr. C. L. Faust of the Battelle Memorial Institute, Columbus, Ohio, will speak on "Electropolishing." Bath compositions, operating techniques, and the relation of electropolishing to the adherence of electrodeposits will be discussed.

Mr. Ovide G. Hogaboom, of the New Britain Machine Company, New Britain, Connecticut, will speak on "Industrial Salvage by Electrodeposition."

Mr. Frank K. Savage, General Superintendent of C. G. Conn, Ltd., will be the third speaker. The subject of his talk will be announced later.

The Banquet will begin at 7:00 P.M. and will be followed by entertainment and dancing. The price of tickets is $3.00 each. As was the case last year, the low price of the ticket is made possible because the costs of the entertainment and the educational session are being born by the Branch Treasury. It is requested that those wishing to attend secure tickets in advance so that sufficient reservations can be made. Tickets may be obtained from Abner Brenner, 6509 Fulton Street, Chevy Case 15, Md.

ABNER BRENNER, *Secretary-Treasurer*

A. B. C. CHEMICAL CO. CHANGES NAME TO CRANE EQUIPMENT & SUPPLY CO.

The A.B.C. Chemical Company announce the change of their name to the Crane Equipment and Supply Company. It is the belief that the new name will better identify the products that the firm now distributes and will fit in better with the post-war plans of the Company.

The Crane Equipment and Supply Company are now New England distributors for the Mechanical Process Company of South Orange, New Jersey, manufacturers of D'Oiler degreasing machines both manual and automatic. They also distribute Westvaco Chlorine Products Corporation TROMEX degreasing solvent. They are also New England sales and service representatives for the Solvents Recovery Service Inc. of Newark, New Jersey whose entire business is devoted to the recovery of lacquer thinners, wash and stripping solvents, and the recovering of trichlorethylene from the sludge of degreasing machines. They also distribute Rackote plating rack insulations and stop-off lacquers. Oil refining and purifying equipment, storage and mixing equipment for corrosive chemicals, synthetic tank linings and corrosive resistant paint are among other products distributed by the Company.

SARCO GETS STAR

The Sarco Co., Inc., New York, received the Army-Navy E award April 22, 1943. On November 25, 1943, they received a renewal with Star for continued excellence.

ROBERT R. DAVIES PASSES

Harshaw Chemical Company announced with deepest sorrow the passing of Robert R. Davies on November 6th. Mr. Davies was manager of the Detroit Sales office.

M. C. BEEBE DIES

Murray Charles Beebe of Cheshire, electrical and chemical engineer, died December 22 in New Haven hospital after a month's illness.

At the Lea Mfg. Co., where he has been research director for the past year and a half, he developed coatings for metals as protection against rust in articles for war production. Previously he had been connected with the Scovill Mfg. Co. for 16 years as director of research

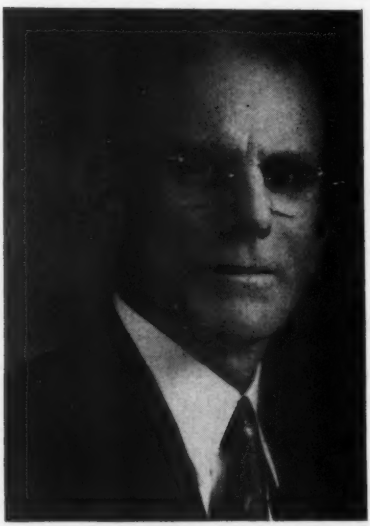
laboratories.

During World War I Mr. Beebe was employed in the Western-Electric Co. and had patents to his credit for submarine detector devices, and developed infra-red signaling devices for the chemical warfare division of the government.

After graduating from the University of Wisconsin in 1897 he was an instructor in electrical engineering at the university for three years after his graduation and returned as head of the electrical engineering department from 1907 to 1918.

As chief engineer of the Wadsworth Watch Case Co. of Dayton, Kentucky from 1920 to 1925 Prof. Beebe developed the brass etching process and a new type of white gold.

Prof. Beebe was a member and examiner of the American Institute of Electrical Engineers, the American Chemical society, and served on the engineering board of University of Conn.



DIXON JOINS LEA

Mr. J. S. Dixon, familiarly known as 'Jack", joined Lea Mfg. Co. November 1 in the capacity of an abrasive engineer doing field and consulting work on engineering problems connected with the burring, abrading and polishing of metals.

Jack is a native of Waterbury, Connecticut, having just finished twenty-four years as Production and Methods Supt. of Russell & Erwin Mfg. Co. Division of American Hardware Corporation, New Britain, Connecticut. Prior to that Jack was with the American Pin Company of Waterville, Connecticut.

Although the nature of his work has been in connection with production methods for metal fabrication in general, he has always been particularly interested and skilled in the electroplating and finishing of metals in general. The multitude of finishes available on builders' hardware involving electroplating, lacquering, coloring and all sorts of

buffing and polishing, offered a very fertile field to Jack with his particular abilities in this direction.

Jack has been a member of the Electroplaters Society, Waterbury Branch, for the past twelve years.

GRAY JOINS LEA

On November 15 Mr. Robert S. Gray joined the staff of the Lea Mfg. Co., as Assistant Chemist and Consultant. "Bob" has had many years experience in electroplating work and is very widely known throughout Connecticut in electroplating circles.

Bob's father, William J. Gray, is known throughout the country as "Bill Gray" and is one of the most widely known men in the entire electroplating industry.

Bob has been a member of the New Haven Branch of American Electroplaters' Society since his active connection with the electroplating industry.

NEW METHOD FOR ANODIZING ZINC TO INCREASE CORROSION RESISTANCE

Informative 4-page leaflet describes ANOZINC,* a fast, easily controlled means of increasing the rust-resistance of zinc coated steel parts and of retarding the formation of white zinc corrosion products. It is applicable to zinc plated on any metal, and in some cases to zinc base die castings.

For countless parts now being plated or black finished, this treatment will mean improved appearance as well as longer service life. Parts finished in ANOZINC baths have stood up in excess of 200 hours under the Army-Navy salt spray test AN-QQ-S-91.

Two attractive finishes are available—a dark, semi-lustrous black and a brassy, slightly iridescent yellow.

Bulletin sent on request. United Chromium, Inc., 51 East 42nd Street, New York 17, N. Y.

*Trade Mark Reg. U. S. Pat. Off.

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Do You Fear Inspection?

Your plating will stand minute scrutiny if your solutions are filtered by —

SPARKLER HORIZONTAL PLATE FILTERS

BECAUSE—filtering the Sparkler way gets rid of all the "bugs" in your solutions, assuring the highest polish. Sediment and grit can spoil the finest operation.

Sparkler filters are readily adaptable to all filtering media —carbons, earths, pads or paper.

It has been proved that heavier filter cake can be built up and retained on a horizontal plane—*the natural way*—than by any other method, resulting in faster flow rates and longer filtering cycles.

Sparkler filters are flexible and dependable, always doing uniform, high-quality work. Compact and convenient machines, easy to clean and handle.

50 to 10,000 G.P.H.

Write for a Sparkler engineer—no obligation or for any special details.

SPARKLER MANUFACTURING CO.

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If Your Rack Coating Requirements Are "DIFFERENT"

Miccro protective coating materials are manufactured for:

- Insulation of plating racks used in almost all cleaning and plating cycles.
- Masking parts for hard chromium plating or selective hardening.
- Protection of baskets used in washing and pickling processes.
- Protecting and beautifying plated or natural metal surfaces.
- Resistance to rust and corrosion.
- And numerous other purposes.

Perhaps you have yet to find a protective coating material that proved entirely satisfactory for your particular purpose. It has been in exactly such situations that Miccro men have stepped in many times and have come up with the exact answer to the customer's problem.

Because Michigan Chrome and Chemical Company manufactures such a wide range of protective coatings, it is often possible that recommendations of standard materials—used alone or in combination —will produce the desired results. In other cases, new materials best suited to the specific purpose are developed in our laboratories.

In your present production—or in the operations which are planned for the future — your protective coating problems can always be solved quickly and conclusively by members of our organization. They are ready to work with you at any time.

MICHIGAN CHROME & CHEMICAL CO.
6344 EAST JEFFERSON • DETROIT 7, MICHIGAN

Need Protection?

Some of the most popular protective tank lining materials are practically unobtainable for the duration, but lead linings are not difficult to supply, and lead gives highly satisfactory protection against the corrosive action of many plating solutions. Storts experience in lining tanks with lead and installing all types of coils, fittings, partitions and other details, is your assurance of protection against the most determined corrosion attacks.

STORTS WELDING COMPANY

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BRANCH NEWS

Business and Social News • Educational Activities

BUFFALO BRANCH

Our regular meeting was called to order by President Logan at 8:30 P.M., Friday, November 12, in Parlor E of Hotel Statler. Five of our six officers answered to the roll call, Dr. Wernlund, our vice-president, having been appropriated by the Toronto Branch for their guest speaker that evening.

The minutes of the October meeting were read and approved. The bills for the previous month, including our Annual Fall Picnic, were read and ordered paid. The president presented the proposed contract with the Hotel for our meeting room for the coming year. A motion by Bill Hart that we accept the contract and pay the Hotel in advance, was seconded by Don Rice and carried.

Considerable interest was displayed by the members on the subject of our question box. On a motion by Tony Nigro, seconded by Al. Lamprecht and carried, the secretary was authorized to have question blanks printed for the question box. The treasurer's report showing a balance of over one thousand dollars was read and accepted with hearty applause. Our treasurer then asked that the Board of Managers audit his books in the near future. This, they agreed to do.

The meeting was then turned over to Jim Guffey of the United Chromium Corporation who gave us a very interesting and informative talk on "The Hard Chromium Plating of Tools."

Mr. Guffey gave a very thorough and comprehensive talk including the "Why" and "How" of Hard Chrome plating and some tentative specifications for various types of work.

Hard Chrome plating saves times and critical materials and reduces the cost of machining operations. Its use has therefore developed rapidly since our entrance into the war. The actual plating is done in the same type of bath and with the same equipment as the conventional Bright Chrome. The main differences are that the Hard Chrome is plated directly onto the steel, and much heavier deposits are required. Adhesion is obtained by etching the base metal anodically in a Chromic Acid Solution or even in the plating bath itself.

Heat treating at 300°-400° F. for 1-3 hours is recommended to eliminate Hydrogen imbrittlement. All specifications for plate thickness are dependent upon the type of tool and the type of work it is called upon to perform. A general rule is that for tougher usage, the lower thickness limits should be used to avoid chipping and spalling. For best results the steel should be heat treated to the proper hardness which is normally C62-C64 Rockwell.

Numerous questions suggested by this informative talk were answered by Mr. Guffey who was then given a rising vote of thanks by all present.

Applications for membership were received from Harry Gipp and Louis Fricano, both of the Buffalo Plating Company. Also present were four guests: John Stroh and Alfred Madsen of the American Sterilizer Company, Charles Hoskins of the Carborundum Company and John Kushner (Rochester Branch) of the Colonial Radio Corp.

The meeting was adjourned at 11:30 P.M.

JAMES C. MAYS, *Secretary*

President Logan called our December meeting to order at 8:30 P.M. Friday, December 10th. Six of our nine officers answered to the roll call. The minutes of the November meeting were read and approved.

The Secretary read a letter from Mr. Teague of the Division of Aircraft Production in Melbourne, Australia. (We have since received his application for membership). The President suggested that our Branch continue correspondence with Mr. Teague through our Secretary.

The bills for the month were read and ordered paid.

The subject of a social get-together for members and friends of the Buffalo Branch was discussed. A motion by Don Rice and seconded by Bill Fotheringham was passed authorizing the president to appoint a committee to plan for a party to be held after the first of the year. The committee includes Don Rice, Chairman, Jim Vitalie, Seibert Johnson, Ralph Gipp and Tony Nigro.

A motion by Ralph Gipp that the proposed party should officially open our Spring membership campaign with a $25 war bond as a prize to the member securing the greatest number of applications by August was seconded by Bill Hart and unanimously approved.

The Librarian announced our January speaker who will be Mr. Myron B. Diggin of the Hanson-Van Winkle-Munning Company. His subject will be announced later.

The Treasurer's report was read and approved. Then followed a report by the Board of Managers indicating that the Treasurer's books had been audited and found to be in good order.

The meeting was then turned over to Bert Kirchoff who showed us a film on the Mining, Smelting and Processing of nickel, supplied through the courtesy of the International Nickel Company of Canada.

Following this interesting and instructive film, the meeting adjourned at 11:15.

JAMES C. MAYS, *Secretary*

PHILADELPHIA BRANCH

Philadelphia Branch had its regular December meeting at an earlier date, Friday the 10th, with President Verrelle presiding.

The gavel was immediately turned over to Librarian Orlik, who introduced the speaker of the evening, Dr. Lowe of the Penna. Salt Mfg. Co.

Dr. Lowe, whose subject was Solvent Emulsion Cleaning, gave a very interesting talk on the advantages of this method before paint or lacquering and as a pre-cleaner before electrocleaning for electroplating.

The Speaker cited the need for this type of cleaner due to the use of heavy drawing oils and compounds used during the present armament program.

The Librarian thanked the Speaker for presenting his subject and called for a rising vote of thanks.

The roll-call of officers and reading of the minutes were dispensed with.

The applications of John J. Devaney, active, Franis J. Fritz, active, and Samuel Heiman, associate, were referred to the Board of Managers.

Charles H. Burris, Jr., associate, Peter A. Vadurro, active, Persifer B. Kennedy, associate, Edward J. Hein, associate, and Edward V. Tapp, associate, after approval by the Board of Managers were elected to membership in their respective classifications.

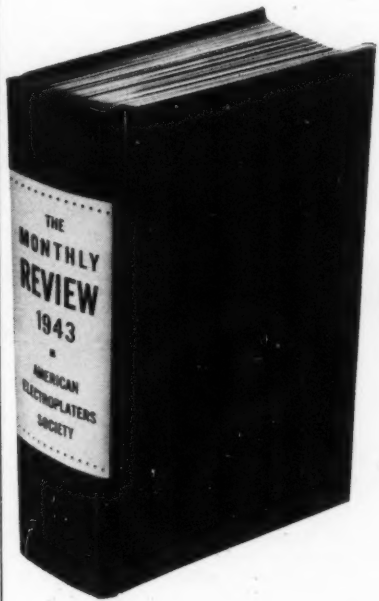
A. Marx, active, W. A. Ross, active, and W. A. Geiger, associate, were dropped from the rolls for non-payment of dues.

Motion—The Secretary to write the Supreme Secretary about a non-participating membership for members who are ill in sanitariums. Carried.

Motion—The bills be paid. Carried.

Adjournment at 10.30 P.M. with 26 present.

PAUL MENTZER, *Secretary*



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THE AMERICAN ELECTROPLATERS SOCIETY

545 Fifth Avenue **New York 17, N. Y.**

SYRACUSE BRANCH

The December meeting of the Syracuse Branch A.E.S. was held Friday, December 17, at the University. Through the courtesy and cooperation of the Hartford Chrome Corporation we had as a speaker that answer to a Chrome Platers prayer, Art Logozzo.

Our President, Dr. Murphy, had arranged for us the showing of a Film on Plastics. This proved to be quite an eye-opener to a lot of us, as well as being fine entertainment. It fitted in remarkably well with a lot of data our speaker had on Hard Chromium plating. Mr. Logozzo once more proved (which isn't necessary) his ability in perhaps the most difficult field of electrodeposition. We feel sure that after hearing him any group in the metal field will be completely sold on Hard Chrome plating. The slides he has collected show very graphically and quite simply some of the fundamentals involved and are very interesting. This meeting was colored (so Art said) by the attendance of a few ladies, so it was just as well that we had him at this meeting, handsome devil that he is. We trust the ladies did not take too much notice of the rest of our Officers, most of whom look like fugitives from Sing Sing. The pulchritude in our Branch is all wrapped up in Paul Swartz, our Librarian,—the girls couldn't keep their eyes off him. I had hoped that Bert Sage of the Waterbury Branch would come along with Mr. Logozzo but I understand at the last minute he got tied up with some rejects or something. Mr. Wood of the Du-Lite Corporation, and this scribe want to assure Art that the sanitary arrangements in 806 of which he disapproved have been mentioned to the management and they have promised to attend to it. (Remodel the hotel or something.) Mr. Logozzo in his talk brings out the importance of further knowledge of metallurgy, particularly in stress, relieving before and after plating the prominent place given to hydrogen embrittlement in all specifications of the Army & Navy give emphasis to this point. I am sure that most of us platers who do some hard chrome plating wish it was as easy as Art seems to make it. However, we also feel that the more we follow out the rules laid down by such an expert the sooner Chromium will be recognized as the marvellous saver of vital tools that it is. Our sincere thanks to Mr. Logozzo and the Hartford Chrome Corporation for an enjoyable and educational evening.

At this meeting, one of our members, the well-known Mr. Gerry Lux, announced his resignation from our Branch. He expects to go to New York next year with the Oakite Corporation. We wish him all the best in his new connection and trust the New York Branch will treat him well.

One new application acted upon.

The January meeting will be a dinner meeting with election of officers to be held the third Friday at a place to be announced.

The meeting adjourned at 10:30 P.M.

GEORGE SIMMONS, *Secretary*

BRIDGEPORT BRANCH

The Bridgeport Branch A.E.S. regular business meeting and Old Timers' Night was held Dec. 10, 1943, at 8:00 P.M. at the Barnum Hotel. President A. R. McNeil was absent due to a business call to Nashville, Tenn., and Supreme 2nd Vice President C. C. Helmle also was absent due to a business call to Chicago, Illinois. Vice President, Herman C. Braun decided to dispense with the formalities of the business meeting and devote the time to Old Timer's Night and called upon R. J. O'Connor to be presiding officer for the function of the evening.

R. J. O'Connor opened the Old Timers' meeting at 8:30 P.M. with 41 members present. We were honored with the presence of our very dear friend, George B. Hogaboom, and including George Knecht, Bob Mooney, Jack Barry, Bill Bridgett, Jack English and John C. Oberender from the New Haven Branch, who were formerly members of the Bridgeport Branch. It was also good to see our Honorary Members of the Bridgeport Branch, Wilbur Stratton and Bill Flaherty and both of these Old Timers were fine. R. J. O'Connor called upon George B. Hogaboom for some of his experiences in

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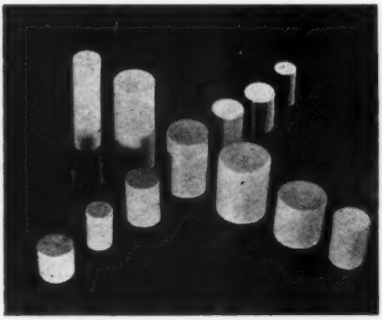

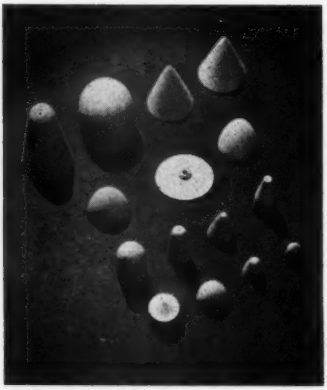

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the Plating Industry and George with his usual grace, dignity and smile said that his entry into the field of plating started in 1888. He recited stories of plating and oxidizing as was done in those early years in New York City, using galvonometers and worked on methods for analyzing plating solutions. He told of his association with the Electroplater's Society way back in 1912, and his experiences with various plating problems that confronted the Industry at that time and how much easier it is now for the plating foreman and workers to do the finishing as compared to the previous early years of Metal Finishing. The story of his experiences were excellent and a very fine book could be written on this. The members present gave George a very fine applause for his talk.

R. J. O'Connor called upon Wilbur Stratton, Honorary Member of the Bridgeport Branch, for some of his experiences in the plating game and Bill being 78 years old, now told of how his father was in the plating business and decided to bring son Wilbur along into this fine profession. He stated that if he had to start all over again he would choose plating as his business career and never in his life has he had any regrets for being a plater. (Applause)

Next to be called was John C. Oberender of the New Haven Branch, who gave his experiences of being a member of the Bridgeport Branch in the old days and joined the Society in 1916. His experience in the plating business goes way back to the early years of the present century before he decided to engage in the supply of the plating industry. Being a member of the Society for a long number of years, has given him fond remembrances of all his friends and associates. (Applause)

Wm. Thompson, an Old Timer of the Branch, gave us some stories of the early days of the Bridgeport Branch and after hearing these reports we must admit that the Branch had members with real material that makes good members and citizens. (Applause)

Wm. Flaherty, Honorary Member of the Bridgeport Branch, was called upon by R. J. O'Connor for a few remarks as an Old Timer of the Branch. He was very glad to see his old friends and was mighty glad to see the new young men coming into our Society. He was very glad to be a member of the American Electroplater's Society during all these years which gave him fond friends and remembrances in this industry during all his years of association. (Applause)

A telegram was read by R. J. O'Connor from President A. R. McNeil who expresses good luck and best wishes to the Old Timers and members present at the meeting.

George Karl has sent a letter wishing the Old Timers and members good luck and regards. He was unable to be present due to being away on business.

Refreshments and beer were served and old time motion pictures were shown. A very good time was had by all present. The Old Timers' meeting was adjourned at 12:15 A.M.

Applications for Membership:

Seymour Wattenberg—Fairfield Terrace, Norwalk, Conn. Active Member

Alexander Weisker—Sprague Electrical Supplies, Inc., 777 Main St., Bridgeport, Conn. Associate Member

Warren Schmidt—3 Rocky Ridge Drive, Bridgeport, Conn. Associate Member

Abraham E. Miller—General Electroplating Co., Stamford, Conn. Associate Member

Lester Toohill, Jr.—70 Prospect St., Portchester, New York. Associate Member

Floyd D. Morris—58 Rose St., Bridgeport, Conn. Associate Member

Abraham J. Mitchell — c/o Contract Plating Co., Stratford, Conn. Associate Member

George A. Frick—c/o Contract Plating Co., Stratford, Conn. Associate Member

George E. DeMattio—73 Frank St., Stamford, Conn. Active Member

Bertie Barrett—86 Loomis St., Devon, Conn. Associate Member

Balloting for Membership:

Vincent J. DeNaples—Ralehar Rd., Noroton Heights, Conn. Associate Member

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Virgilio S. Consalvo, 464 Park Pl., Bridgeport, Conn. Associate Member

Bruce L. Taylor—70 Third St., Stamford, Conn. Associate Member

Vice President, Herman C. Braun, turned the applications over to the Board of Managers for approval.

The financial report of the Old Timers' Night is as follows:

Receipts:

41 Members (3 gratis) at $1.50 ea.		$57.00
Mr. Hogaboom)		
Mr. Stratton) gratis		
Mr. Flaherty)		
Expenses:		
Restaurant	$58.20	
Service Charge	5.80	
		64.00
Deficit		$ 7.00

The meeting and the Old Timers' Night adjourned at 12:15 A.M.

An open meeting and educational session was held Friday, November 19, 1943 at 8:00 P.M. at the South Parlor, Stratfield Hotel. President A. R. McNeil opened the meeting and Technical Chairman, J. E. Charleson, presided with 45 members and guests present. The speaker of the evening was Mr. A. R. Goodkin of the All-Brite Chemical Co., Waterbury, Conn., who spoke on the subject of "Anodizing of Aluminum," both Chromic Acid and Sulphuric Acid, A.C. or D.C. current, Coloring of Anodic Films. Mr. Goodkin is extremely well qualified to speak on this subject as he has completed an extensive research program on anodizing in all its phases. The audience throughout the entire session listened attentively and many questions were asked which were nicely explained by Mr. Goodkin who we must admit, knows his anodizing well. The Bridgeport Branch gave Mr. Goodkin a rising vote of thanks for his interesting talk. Following this subject, the "Finishing Clinic" which was scheduled for the previous open meeting was held with George B. Hogaboom, Dr. Meyer, A. R. Goodkin, R. J. O'Connor and Fred Erlenmeyer as the Board of Experts. We might mention here that during the discussion of Mr. Goodkin's subject, George Hogaboom at intervals would get up and read letters upon patents for this and that and finally someone in the audience remarked that George, besides being an expert on plating and finishing would well qualify as a patent lawyer and expert. The following questions and answers were brought up during Finishing Clinic Session:

Q. How can S.A.E. 4130 steel be plated with cadmium without blistering?

A. It was suggested to try a cadmium chloride strike similar to the nickel chloride strike, and then cadmium plate at a low current density at least during the first part of the cycle.

Q. What can be suggested as a cleaning procedure for plating zinc over zinc that has slightly oxidized?

A. The use of a revere cleaner of 4 ozs./gal. sodium cyanide and 4 ozs./gal. caustic soda was suggested. Try a dip in acetic acid to remove the zinc oxide film.

Q. What is the effect of pH change in the dye solution for anodized aluminum?

A. The most serious effect is a breakdown of the dye.

Q. How can steels containing molybdenum be hard chrome plated?

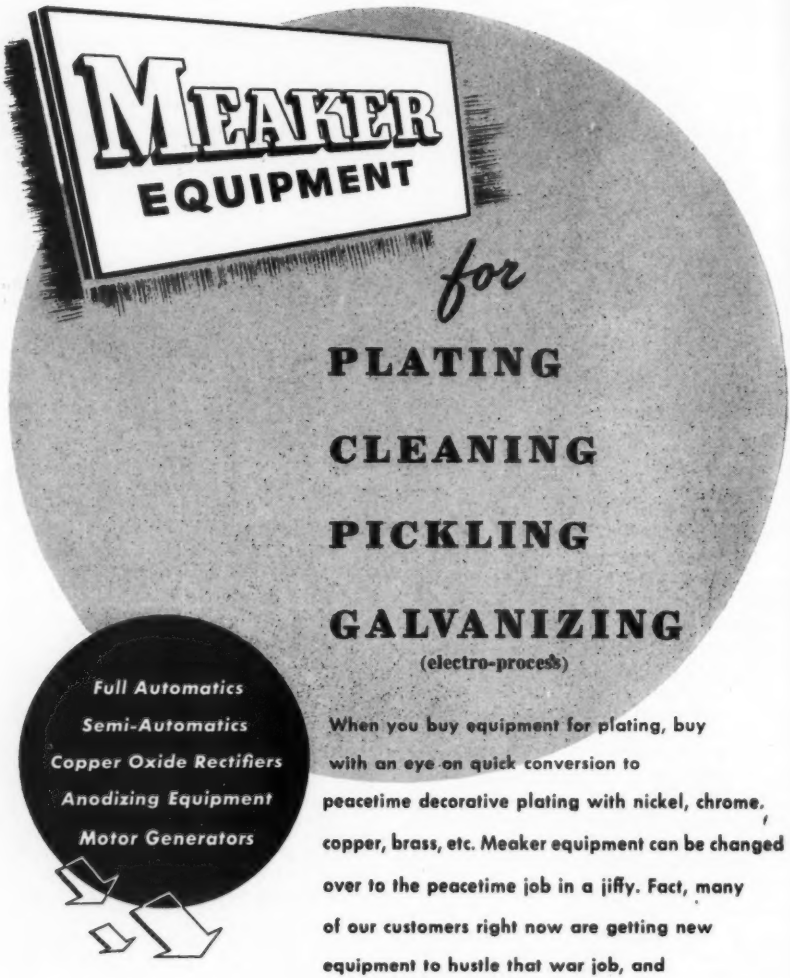
A. Keep away from acid dips and do not use a reverse etch, but plate directly with chromium in the usual manner.

It was agreed by all present that this was a fine interesting session and the meeting was adjourned at 12:00 midnight.

JOSEPH G. STERLING,
Sec'y and Treasurer

HARTFORD BRANCH

The Hartford Branch held its December 20th meeting at the Hotel Stanley in New Britain, Connecticut. There were fifty-five members present to hear "Chic" Helmle give a fine talk on Cleaning and Plating Cycles. "Chic" generously drew from his wealth of experience in illustrating the various points he wished to put across. The talk was very informative and well re-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ceived. Several new members were elected and applications received.

S. ZAVARELA, *Sec'y.-Treas.*

WATERBURY BRANCH

Waterbury Branch held its regular monthly meeting in the Colonial Room of the Hotel Elton, Friday, December 10, 1943, the meeting being preceded by dinner at 6:30 P.M.

At 8 o'clock, President, Carl Kilborn, opened the technical session with 53 people present, among them several members of the newly formed Plastics Society, whom we were very pleased to have with us.

William Gray, Chairman of the Sick Committee, requested that all members keep him informed of any sickness among our membership.

In the absence of Laverne Verzier, Bill Starr acted as Technical Chairman, calling first upon George Dubpernell for his book report. The book reviewed for this evening was by E. S. Lincoln, "Industrial and Commercial Electrical Reference." While this book is a collection of electrical catalogs, it is still very much more, for it has many pages of equipment and diagrams, and the explanations are clear and concise.

For his regular feature on priorities, Bill Starr discussed the new R Q D plan. R Q D appears to stand for Request-Quandry-Deferment Plan. As the Secretary's head was in a bit of a whirl at the conclusion of this discussion, it is suggested that all those interested write directly to Bill Starr for further details.

Everyone was disappointed that the announced movies did not arrive in time for showing. The titles indicate the films should be of intense interest and it is hoped that they can be shown at a later date. We did, however, have an excellent substitute in a film entitled "Stainless Steel," furnished us by the Bureau of Mines. A good bit of comedy was also portrayed in "The Timid Ghost."

Immediately after the showing of the films, the meeting was turned over to our speakers. Mr. Eric W. Soderberg, Plant Superintendent of the Watertown Mfg. Co. first talked about plastics for ornamentation and corrosion resistance.

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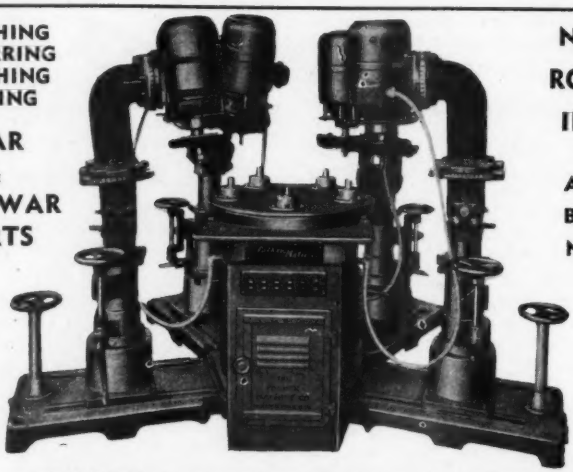

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He pointed out that plastics are made from common materials which have been taken apart and then put together again in various ways to obtain special properties. They may be designed for use as structural members, for shock absorbing purposes, and as electric or heat insulators. They may be given great corrosion or chemical resistance and then again they may be designed purely for decorative purposes.

In the field of decoration designers have had the opportunity to use their imagination because of the infinite varieties of colors and materials available. In corrosion and chemical resistance such items as piping and fitting have properties which compare favorably or exceed those of metals.

Mr. Adolph Bregman, Consulting Engineer, discussed metals for ornamentation and for corrosion resistance. Metals have been used for centuries, and there is an enormous background of information available, while plastics are relatively unknown. For corrosion resistance, it is possible to select a metal to stand practically any condition, while in the field of decoration designers and architects still turn to metals as a medium, in preference to any other material.

Both speakers agreed that plastics and metals would be used together, neither would supplant the other but the use of the two would increase the value of each.

The speakers were listened to with attention, many questions were asked and interesting discussions developed. In conclusion a rising vote of thanks was extended these men who so ably presented these subjects.

The meeting adjourned at 10:45 P.M.

S. L. HENN, *Secretary*

CHICAGO BRANCH

The meeting was turned over to Librarian J. E. Charleson, who conducted a round table discussion on the various questions asked and answered.

Is it possible to deposit .008″ of chromium over nickel plated brass?

Ans. Assuming that the adhesion between the brass and nickel is good, no difficulty should be experienced.

How can spotting out of copper plated steel be prevented without the use of lacquer; which is not acceptable as the deposit is used to form an electrical contact?

Ans. A thin coat of water dip lacquer can be used as this film does not interfere with the making of the average electrical contact.

What is a good container for a nitric-hydrofluoric acid mixture?

Ans. A steel tank lined with carbon brick bonded together with a special polymerized sulphur cement.

What is the effect on anodized aluminum if a chromic acid anodizing bath is operated at 110° F. instead of the recommended 95° F?

Ans. The current density increases, causing an increase in the film thickness, while the practical film efficiency decreases. Increased temperatures should not be used on alloys high in copper or silicon as the piece may be damaged.

Has anyone had any experience with the potassium ferrocyanide gold solution for rapid plating?

Ans. No.

The meeting was adjourned at 11:00 P.M.

JOSEPH G. STERLING, *Sec'y-Treas.*

PROVIDENCE-ATTLEBORO

Is chromium plating at 180° F workable?

Ans. Only for hardness.

Is there any advantage in chrome plating at 180° F?.

Ans. No. It is impracticable as it uses too much power, etc.

Is it possible to chrome plate knife edges without having excessive building up of the deposit?

Ans. Yes, by using a proper thief. However, use of lower voltages rather than a thief is recommended if possible.

How may current distribution in chrome plating be improved?

Ans. Current distribution may be improved by:

1. Hanging the anodes so that the top of the anode is at a lower level than the top of the work, and the bottom of the anode is at a

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higher level than the bottom of the work.
2. By using fewer anodes, and
3. By moving the anodes as close to the work as possible.

ALFRED J. MARSHALL, *Librarian*

LANCASTER BRANCH

The Lancaster Branch of the A. E. S. met Friday night, Nov. 12th at the Manufacturers Building, York, Pa. There were 22 members and guests present.

The Chairman of the program committee announced that we would have an oyster bake at our meeting on Dec. 10th and that it would be held in the Redman's Hall. A charge of 50c will be made.

The Chairman of the Branch introduced LeRoy Critchfield, the founder of the Lancaster Branch, who told us he was glad to be able to visit us again.

The speakers of the evening were two of our members Mr. Rowland Hoenstine, Chief Chemist of the American Wire Fabricating Co. and Mr. Gebert, Chief Metallurgist of the York Branch of the American Chain Co.

These two men had constructed an apparatus using a glass cell which could be inserted into a slide projecter. The cell contained a cathode and anode and was projected on the screen and magnified 24 times.

Samples of Copper, Nickel, Zinc and Chrome plating baths were placed in the cells, the anodes and cathodes inserted and the plating action observed on the screen. It was very easy to see the gas forming at the cathode, the effect of adding cyanide and addition agents to the baths, and other items of interest not ordinarily seen when plating.

The meeting was adjourned at 10:30 o'clock.

W. H. FORDNEY,
Secretary

DETROIT BRANCH

On Friday, November 5, 1943, Detroit Branch held their regular monthly meeting at the Hotel Statler, with President J. E. Fritts presiding.

The minutes of the last meeting were read and adopted. The membership committee reported and seventeen ap-

plications for membership were read and passed on to the Board of Managers for action. The following were elected to membership: Miss Helen Stengel, Associate; J. F. McCaig, Active; J. Chemielewski, Active; H. F. Lenz, Active; F. R. Ford, Associate; J. Tordosinsky, Active; A. W. Rose, Active; H. K. Creese, Active.

The moving picture shown was titled "Building a Tank," and was an educational exposition of building the M3 Medium Tank. Dr. J. E. Starech, from United Chromium, then took over the meeting and held the attention of the 115 members and friends present while he discussed "Anozine," which, as the name implies, is an anodic coating for zinc. Both yellow and black coatings of "Anozinc" are obtained from separate solutions and are said to be hard, and possess good wear resistance. As explained, the process is a room temperature, low-current 2-5 minute operation with excellent throwing power. Salt-spray tests meet government specifications and the work has a pleasing appearance.

Dr. Saltonstall, who is chairman of the committee arranging for the December 4th annual party, urged members to order tickets and tables early, as the Statler Hotel has set definite limits on the number of accomodations. After the meeting, there was a lively demand for reservations and all tickets were sold by November 15th.

A well-filled box of questions, mostly aimed at Dr. Starech, was taken care of and the best attended meeting of the season closed in good time.

F. L. CLIFTON,
Secretary-Treasurer.

PITTSBURGH BRANCH

The regular monthly meeting of the Pittsburgh Branch of the American Electroplaters' Society was held Thursday evening, November 11, at the Fort Pitt Hotel. As usual, the 8 o'clock meeting was preceded by a dinner at 6:30. President H. F. Saylor presided over the meeting.

The minutes of the October meeting were read and approved. Mr. William Hennessy suggested that we have tags for everyone to wear so that we can

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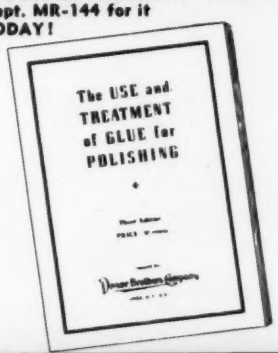

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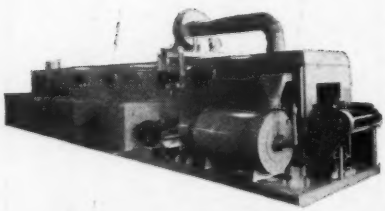

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get acquainted more easily. Mr. Rimbach suggested a card 3 inches by 7 inches for the vest pocket, which can be collected at the close of each meeting. It was agreed for the Secretary to get cards for the next meeting.

Considerable time was spent on suggesting speakers for the various meetings. Many members liked the idea of having one meeting for a forum conducted by the local members. This can be conducted as a "Quiz" or "Information, Please" program, or can be a part of a meeting where a Branch member gives a short talk. Mr. Hennessy suggested that since the Pittsburgh Branch has such a wealth of members in the electro-tin strip business that at least one meeting should be held on this subject. Other suggestions were: "Anozinc," by United Chrome; "Organic Finishes," and a talk by Dr. J. C. Warner. It was announced that Mr. Diggin of Hanson Van-Winkle Munning Company talked to the Iron and Steel Society recently on post-war plating.

Commander Leahy of the Coast Guard spoke on the defense of the various industrial centers of the United States. He cautioned against the wave of over-optimism spreading over the country and said he is still fearful of token air raids and organized sabotage. He also reviewed the operations of the Coast Guard during peace-time and war-time.

Mr. Richard Rimbach of the Pittsburgh Branch, presented a talk and slides on the nickel-plating of fine wire as a substitute for all nickel wire in electrical filaments. His slides showed diagrams of the process used and actual photographs of the line in operation. His talk was very interesting and well received as evidenced by the long discussion period that followed.

The meeting was adjourned at 10:45.

FRANK R. KELLER.

BOSTON BRANCH

Boston Branch met Thursday, December 2nd, at the Statler Hotel. Boston, with President Swift in the chair.

Minutes of the previous meeting were read and approved.

Communications read: One was that of a suggestion that the branch set up a Servicemen's fund for the entertaining, gifts, and the welcoming home of the members of the Boston Branch, after the war, said fund to be accumulated by a system of voluntary contributions at the regular meetings. Motion was made and passed to make Charles Hardy chairman of this fund. Other communications were placed on file.

Bills were read and ordered paid.

One application was read and approved by the Board of Managers, and elected to membership was Felix Sbrogna, 5 Imperial Road, Worcester, Mass., Active.

Five more applications were read for the first time and turned over to the Board of Managers, as follows: Salvatore Aversa, 189 Clare Ave., Hyde Park, Mass., Active; Robert E. Callahan, Olean Rd., Burlington, Mass., Active; Edward M. Whalen, 14 Chestnut St., Danvers, Mass., Active; John J. Davis, 66a Grampian Way, Dorchester, Mass., Active; Roy A. Anderson, 383 Harvard St., Cambridge, Mass., Associate; and Jerry Capozzoli, 30 Clapp St., Stoughton, Mass., Active.

The Librarian introduced the speaker of the evening, Mr. Ralph McCahan of the Du Pont Co. His subject was "His Experiences in Zinc Plating." This was one of the finest talks the branch has heard in a long time. He spoke of the plating of zinc in barrels and also still solutions; also of bright zinc plating and showed samples done in a bright zinc still solution. These were passed around to the members.

He answered questions for more than an hour after which a moving picture was shown taken in Hollywood. This was interesting. A rising vote of thanks was given Ralph for a very fine evening and we are sure that the members got some good information from the talk. Come again, Ralph. You are always welcome to Boston Branch.

Meeting adjourned at 11 P. M.

A. W. GARRETT,
Secretary-Treasurer.

MILWAUKEE BRANCH

On November 5th, 1943, the officers of the Milwaukee Branch met at 7:30 to preview the business on hand. The meeting was brought to order by Presi-

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dent Robert Steuernagel, Jr. The minutes were read by the Secretary.

A letter from Mr. B. Nordblom asking for information about experienced platers was read. Mr. William Geissman reported that he had accepted for the Milwaukee Branch the following committee jobs to help make the Electro Chemical Society's annual National Convention a success; entertainment, hotel, finance, registration, and program.

The officers voted to buy flowers for Mrs. Dan Wittig who has been ill since last spring.

The officers' meeting ended with the opening of the 344th regular meeting. The Secretary read the minutes of the previous meeting and a general financial report.

The following men were elected to membership in the Milwaukee Branch: Mr. Frederick Lemke of the Simmons Company in Kenosha as an active member, Mr. Leo M. Wokosm of Diversey Corporation as an associate member, and Mr. E. R. Frost of the E. R. Frost Company as an associate member.

The meeting was then turned over to Mr. William Geissman, who introduced Mr. E. B. Lewis of the Du Lite Company who gave a fine talk on Blackening of Steel with low temperature baths. His talk was very well received as the lengthy discussion that followed amply proved.

Mr. Morrison of the Illinois Water Treatment Company was then introduced by Mr. Geissman. His talk covered many interesting applications of purifying water and the removal of undesirable ions from solutions. I'm sure all those present enjoyed his talk very much.

The turn-out for this meeting was as large if not larger than the October group. Everyone present was really satisfied with the results of our Librarian, William Geissman, who has spent much time in bringing to our meetings some fine speakers on topics of vital interest. Mr. Geissman says that this is only the beginning.

The December meeting of the Milwaukee Branch was held December 3rd. Mr. Steuernagel, Jr., and the officers completed the business in short order and the following were selected as a committee for our banquet to be held April 29, 1944, at the Schroeder Hotel. Mr. Al Hermansen, Chairman; Mr. William Geissman, Education; Mr. Robert Goodsell, Publicity; Mr. Axel Johnson, Hotel and Menu; Mr. Henry Binder, Advisor.

Applications for membership were received from Mr. Arthur J. Noel, Active, of the Globe Union Company, Milwaukee, and Mr. William J. Trickey, Associate, of the Northwest Chemical Co., Detroit.

After a preview of business, our regular meeting opened at 8 o'clock. Mr. Geissman introduced Mr. Phil Ritzenthaler, who needs no introduction to the Milwaukee Branch, since he has been an active member for several years.

Mr. Ritzenthaler talked about and displayed samples of his hard nickel plating. He has spent much time and labor in the last four years or so, perfecting his plating technique. Although he did not divulge details, the technique involves ways and means of plating nickel on steel and nickel with excellent adherence. He claims an atomic bonding between the nickel and steel. He showed samples of his plating on which tests of adherence had been performed. These samples were chiseled to try and remove the plate but the break was not in the bond. He explained that the field for hard nickel was just opening. The only reason it has not been exploited fully has been the lack of good bonding between the nickel and the basis metal. Mr. Ritzenthaler also displayed some samples of electro-forming of dies for plastics. He was given a rising round of applause.

JAMES DURNFORD,
Secretary.

BRIDGEPORT BRANCH

Minutes of the meeting of the American Electroplaters' Society held Friday, November 5, 1943.

The regular monthly meeting of the Bridgeport Branch of the American Electroplaters' Society was held November 5, 1943, at the Chamber of Commerce Rooms, Stratfield Hotel. President A. R. McNeil opened the meeting with thirty members present.

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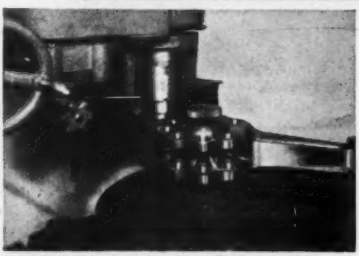

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The roll call of officers was read and B. F. Kusterer, Board of Managers and Frank Kalafus and John Schneider of the Membership Committee were reported absent. The minutes of the previous meeting were read and accepted.

Reports of Special Committees:

No special committees appointed at this time.

Reports of Standing Committees:

Fred Gotthardt, chairman of the Sick Committee, reported no sickness during the past month.

Hubert M. Goldman, Chairman of the Membership Committee, reported three applications for membership.

John E. Charleson, Librarian and Technical Session Chairman, with the fine assistance of A. R. McNeil, C. C. Helmle and Larry Griffin have made arrangements to hold an Educational Session and Open Meeting, Friday, November 19, 1943, at 8:00 P. M., on the South Parlor, Stratfield Hotel. Mr. A. R. Goodkin of the All-Brite Chemical Co., Waterbury, Conn., will speak on the subject of "Anodizing of Aluminum," both Chromic Acid and Sulphuric Acid - AC vs. DC Current and Coloring of Anodic Films. It was also suggested that the finishing clinic scheduled for the last open meeting will definitely be held after Mr. Goodkin's discussion period.

Communications:

A letter from the American Society of Mechanical Engineers from P. A. Ibold, chairman of the Bridgeport Section, asking for the continued support and cooperation of the sections of other Societies in the War Production Conferences with their respective presidents urged to enlist their participation. A letter was sent to Mr. W. H. Sniffen, Secretary of the Bridgeport Section of the American Society of Mechanical Engineers, offering our willingness to cooperate to related activities requested by the War Production Board. President A. R. McNeil has accepted their invitation to be present at their next meeting, Tuesday, November 16, 1943, at 8:00 P. M., at the Auditorium, Burroughs Library, 925 Broad St., Bridgeport, Conn.

A letter from member Edward Loeffel that he is now in the Armed Forces, stationed at Camp Parks, California.

Applications for Membership:

Vincent J. DeNaples, Ralehar Road, Noroton Heights, Conn., Associate member; Virgilio S. Consalvo, 464 Park Place, Bridgeport, Conn, Associate member; Bruce L. Taylor, 70 Third St., Stamford, Conn., Associate member.

Balloting for Membership: None.

Unfinished Business: None.

New Business:

Edward Loeffel was taken into the Armed Forces. We now have five members in the U. S. Armed Services.

Bills against the Branch were ordered paid.

Good of the Order:

A motion was made and passed to hold an Old Timer's Night in conjunction with a regular meeting. It is with our usual tradition that we hold such a meeting and President A. R. McNeil has appointed the following to serve as a committee for Old Timer's Night to be held in December at some selected place: C. C. Helmle, Chairman; F. B. Gotthardt, A. R. McNeil.

The Treasurer's report was read and accepted.

The meeting was turned over to the Librarian, J. E. Charleson, who conducted a round-table discussion on the various problems of the Plating Industry.

The meeting was adjourned at 11:00 P. M.

JOSEPH G. STERLING,
Secretary and Treasurer.

An Open Meeting and Educational Session was held October 22, 1943, at 8:00 P. M., at the South Parlor, Stratfield Hotel. President A. R. McNeil opened the meeting and called upon C. C. Helmle to preside as Technical Chairman in the presence of a fine assembly of 73 members and guests. A motion picture of "Scenes and Personalities," at the June, 1943, A.E.S. Convention in Buffalo, was shown with C. C. Helmle as narrator. Following was a motion picture of "Setting Up of a Greaseless Compound Polishing Wheel" (in color) narrated by Hank Kellner of the Lea Mfg. Co., Waterbury, Conn.

The speaker of the evening was Mr. Arthur Logozzo of the Hartford Chrome Corp., Hartford, Conn., who spoke on

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the subject of "Hard Chromium Plating." This surely was a fine session, as Art had the attention of the audience throughout the entire session, which lasted into a late hour. Thank you, Art, for the nice job you've done. It was decided that the Clinic on Finishing would be held at the next open meeting in November.

Meeting adjourned at 11:30 P. M.

JOSEPH G. STERLING,
Secretary and Treasurer.

SPRINGFIELD BRANCH

The regular monthly meeting of the Springfield Branch, American Electroplaters' Society, was held at the Hotel Charles, Springfield, Mass., on Monday, October 25th, at 8:00 P. M. The meeting was called to order by President Plank. The minutes of the previous meeting were read and approved.

Mr. George Hogaboom, speaker of the evening, and one of the founders of the American Electroplaters' Society, installed the new 1943-1944 officers. They are as follows: President, Norman Plank; Vice-President, Arthur Zavarella; Secretary and Treasurer, Derick Hartshorn, Jr.; Librarian, Frank J. Clark; and Board of Managers, T. J. Murray, Harold Narcus and William Hanford.

The Secretary read a letter from Mr. C. C. Helmle, 2nd Vice-President of the National Society, in which he outlined the plans for the coming membership campaign. He asked that we appoint a chairman from the Springfield Branch. The following chairman and co-chairman were appointed: Art Zavarella and Fred D. Crosby.

The Secretary read an application from Mr. O. H. Doll, General Electric Co., for Associate membership. The application was placed on file, and will be voted on at the coming meeting.

In view of the fact that members from Pittsfield must catch an early train back, it was decided to hold the business meeting at 7:30 so that the speaker will be able to start his talk promptly at 8:00, and thus enable the Pittsfield members to hear the entire talk and not miss their train back. The next meeting will start at 7:30 and all members who wish to participate in the business session will be on hand then.

Mr. Fred Hampson of The Plating Processes Corp., Holyoke, Mass., has agreed to present a paper at the October meeting entitled: "Electronic Tank Controls." We will be pleased to hear this talk since it has been well received at several other branch meetings.

Mr. Frank Clark, Librarian, then introduced the speaker of the evening, Mr. George Hogaboom, who presented a very interesting paper entitled: "The Present Status of the Electroplating Industry." Mr. Hogaboom described the various applications for electroplating in the War Program. He also explained how the plating industry has saved vast sums of money, and produced a much superior product. An enthusiastic question and answer period followed Mr. Hogaboom's talk and he was given a rising vote of thanks.

D. S. HARTSHORN, JR.
Secretary.

SPRINGFIELD BRANCH

The October meeting of the Springfield Branch, American Electroplaters' Society, was held at the Hotel Charles on the 25th at 8:00 P. M. The meeting was called to order at 8:15 by President Norman Plank.

Due to the unexpected absence of Secretary-Treasurer Hartshorn, the minutes of the September meeting were not read. There being no business to consider, President Plank turned the meeting over to Librarian Frank Clark, who introduced the speaker.

Mr. Fred Hampson of the Plating Process Corp., Holyoke, Mass., then gave a talk and demonstration on the Electronic Tank Control. The features of this instrument are: (1) level control; (2) temperature control; (3) overflow warning. The discussion period which followed the talk and demonstration was concerned with the principles and practical application of Electronic Controls.

President Plank suggested that Mr. Hampson might be willing to lead a discussion on Hard Chromium Plating. Mr. Hampson consented and a very interesting and stimulating discussion of various angles of hard chromium plating followed. Mr. Hampson was given a

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rising vote of thanks and the meeting adjourned at 10:15.

PAUL F. LYMAN,
Asst. Secretary-Treasurer

SPRINGFIELD BRANCH

The regular monthly meeting of the Springfield Branch, American Electroplaters' Society, was held at the Hotel Charles, Springfield, Mass., on November 22nd. The minutes of the September and October meetings were read and approved.

The application for associate membership from Mr. O. H. Doll, of the General Electric Co., Pittsfield, Mass., was read and Mr. Doll was voted a member of the Society. The applications of Fred W. Hampson, Plating Process Corp., Holyoke, Mass.; Frederick W. Sheehan, Perkins Machine & Gear Co., West Springfield, Mass.; and James Lynch, General Electric Co., Pittsfield, Mass., were read and placed on file.

President Norman Plank then introduced the speaker of the evening, Dr. Walter R. Meyer, Technical Director of the Enthone Co., New Haven, Conn., who presented an interesting talk entitled "Preparation of Metal for Plating."

He first discussed the various cleaning methods including emulsion cleaning, vapor-solvent cleaning, and alkali cleaning. The theoretical aspect of alkali cleaning such as wetting, emulsification and saponification were treated in some detail.

The effects of overpickling were illustrated by means of lantern slides. Overpickling may result in excess smut formations in the case of steel, or may result in increased diffusion in the case of copper plating on zinc base die castings.

An active discussion period followed the talk, and Dr. Meyer was given a rising vote of thanks for his excellent paper.

The meeting adjourned at 10:30 P.M.

D. S. HARTSHORN, JR.,
Secretary-Treasurer.

CHICAGO BRANCH

The regular monthly meeting of Chicago Branch was held Friday, December 10, 1943, at the Atlantic Hotel.

President R. J. Hazucha presided and all other officers were present.

A letter regarding the 6th annual educational session and dinner dance to be held at Grand Rapids on January 15, 1944, by Grand Rapids Branch was read and placed on file.

President Hazucha called on one of the Chicago branch members who had been away for some time in the armed services, Major H. Faint, who at present is stationed in Chicago. Major Faint made an interesting talk and his many friends were very pleased to see him again.

Our Librarian Mr. Krentel, introduced the guest speaker of the evening, Mr. H. B. Cook, of the General Controls Co., Inc., of Chicago, who gave a very interesting and instructive talk on "Methods of Controlling Temperatures of Plating Solutions."

Mr. Smallman, the Chairman of the Banquet Committee, urges all the members to keep in mind the date January 22, 1944, at the Palmer House, for our 32nd Annual Educational Session and Banquet.

Mr. H. A. Gilbertson was present at this meeting, the first that he has been able to attend after being ill since August, and his many friends were sure happy to see him up and around again.

The following questions were found in the question box:

1. In the potassium nitrate type silver solutions, what is the upper limit for carbonate content, also what bad effects does the carbonates produce.

Answer—The limit is usually about 6-8 oz. and the bad effects are grainy deposits and cuts down efficiency.

2. What is the inhibitor against etching Aluminum when cleaning in strong caustic solutions.

Answer—As far as we know there is no inhibitor for the above, but it was suggested to use a milder cleaner.

3. In a gold solution can a low amount of Pot. Gold Cyanide be used, and is there any advantage in using a gold strike.

Answer—Any low amount of gold can be used but standard solutions run from 3 to 5 pennyweight, and a gold strike is of help when plating over certain types of metals.

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4. Is setting up polishing wheels with cement as good as glue for all-around use.

Answer—After some discussion it was agreed that both cement and glue have their places but most of those present preferred the glue.

5. Has anyone present had experience or know of a bronze solution made with sodium stannate instead of zinc cyanide.

Answer—Yes, this is a patented solution and the P.H. is controlled and you need both copper and tin anodes with a voltage control on each type of anode.

6. Is animal glue out of date as a brightener in a zinc solution. If so, what is used and why.

Answer—While some glue is still being used, it was suggested that the prepared brighteners on the market would give better and more uniform results.

7. What method is used for determining the copper-zinc ratio of brass plating for rubber adhesion; what is the ratio.

Answer—The ratio is usually 76-24, but no one alloy of brass will be satisfactory for all types of rubber. Strip the brass in Nitric acid and use the Electrolytic method for testing copper; then test for the amount of Zinc.

There were sixty in attendance at this meeting, which adjourned at 10:50 P. M.

J. W. HANLON,
Secretary.

TOLEDO BRANCH

A regular monthly meeting of the Toledo Branch was held on Thursday, November 4th, 1943, at the Hillcrest Hotel.

The meeting was opened by the President, Mr. Dressel, at 8:30 P. M., with fifteen members and three guests present. The minutes of the previous meeting were approved as read.

Under communications, a letter was read regarding information pertaining to Detroit's annual meeting and "Big Doings" to be held at the Statler Hotel in Detroit, Michigan.

There was a general fifteen minute discussion under the heading of the welfare of the Branch.

At this time Mr. Dressel introduced the speaker of the evening, Mr. Schweiker of the Du Pont Co. Mr. Schweiker's very enlightening talk on sulfanate lead plating was very well received by every one present, and made much more interesting and understandable by the speaker's ability to express his highly technical information into the average plater's language. At the conclusion of his talk, Mr. Schweiker answered many questions pertaining to the subject matter.

A vote of thanks was given the speaker, and the Du Pont Co., who made it possible for our Branch to have such a capable man as Mr. Schweiker on our educational program.

On a motion by Mr. Vannorsdall and seconded by Mr. Miner, the meeting adjourned at 10:00 o'clock P. M.

GASTON BERGEMAN,
Secretary.

ROCHESTER BRANCH

The regular monthly meeting of the Rochester Branch of the A. E. S. was held at the Chamber of Commerce on Wednesday, December 8th, 1943.

John Q. Adams, President, opened the meeting at 8:30 P. M. The minutes and treasury report of the previous meeting were read and approved.

It was voted that $25.00 be provided for educational books. Mr. William Tucker, our educational chairman, will make the purchase and maintain a shelf in the Rundel Library for the Branch members.

The Committees will meet Monday evening, December 13th, 1943, to make further plans for the educational dinner dance to be held on March 20th, 1943.

Mr. William Tucker then introduced Doctor Lowe of the Pennsylvania Salt Manufacturing Company. Doctor Lowe gave a very interesting paper entitled "Precleaning With Solvent Emulsions."

We, of the Rochester Branch, wish to thank Doctor Lowe again for his well prepared paper, for the time and effort spent, and for a very instructive evening.

The meeting adjourned at 10:30 P.M.

DONALD C. BLUM,
Secretary-Treasurer.

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THE ABSTRACT SECTION

MAURICE R. CALDWELL

Chairman Program and Educational Committee

Effect of Camouflage Painting on the Temperature of Plant Equipment. OLIVER W. JOHNSON. *Gas* **19,** No. 5, 30-3 (1943).—The following conclusions were reached: (1) The use of dark camouflage color instead of white or aluminum is likely to increase by at least two-fold the heat absorbed from the sun's rays. (2) The temp. increase which results will depend on the nature of the equipment, and the effect on specific circumstances. (3) The property of infrared reflectivity in camouflage paints makes it possible for a painted object to match certain types of surroundings both visually and when photographed with filter and infrared sensitive film. (4) The principal justification for the use of infrared reflective paints arises from the photographic quality of the paint as compared with that of surroundings, and to use such paint where not needed would yield only minor advantage in decreased temp.

R. W. RYAN, *Chemical Abstracts*

Paint as a Material of War. A. I. TOTTEN, JR. *Am. Paint J.* **27,** No. 33 16, 18, 19, 46-7, 50 (1943).—A general summary of the use of paint as a war material. Emphasis is made of the use of paint for protection of instruments of war against corrosion, as a camouflage agent, and similar uses. Paint industry's responsibilities in conservation of strategic materials are noted.

W. H. BOYNTON, *Chemical Abstracts*

Solvent Recovery (from Paint-Finishing Plants). R. S. ANDERSON. *Ind. Finishing* **18,** No. 4, 82, 84 (1942.)—Fifteen to 50% of chlorinated solvent can be recovered from the sludge degreasing machines. Up to 93% of solvent is recoverable from washing thinners.

B. C. P. A., *Chemical Abstracts*

Application of "Hot" Lacquers and Dopes. RALPH L. ERICSSON. *Am. Paint J.* **27,** No. 32, 40, 44, 46, 48-9, 52 (1943.)—The applications of lacquers and dopes at elevated temps. offers the following advantages: a substantial reduction in the no. of man-hrs. required for a given finishing job and a worthwhile saving in the amts. of solvents required to apply the lacquer, the fewer coats needed meaning a saving of time in the finishing room and the capacity of the equipment is thereby increased. Up to 25% savings of thinner can be effected as a result of "hot" lacquering. Curves show the marked reduction in viscosity of nitrocellulose lacquers at higher temps., the increase in lacquer solids content with temp. change holding a viscosity at 40 centipoises, also the effect of temp. on diln. ratios of solvent for diluents and the effect of variation in the proportion of diluents on the viscosity of lacquers.

W. H. BOYNTON, *Chemical Abstracts*

The Useful Life of Pyro-, Meta-, and Tetraphosphates. By RALPH A. MORGEN and ROBERT L. SWOOPE. *Ind. & Eng. Chem.* **35,** 821-4 (1943). (Note: Since various complex phosphates have been used in alkaline cleaning baths, the stability of these compounds is of importance to the electroplater.—E.H.L.) It is shown that in alkaline solution, sodium hexametaphosphate is converted almost completely to the ordinary orthophosphate in a few hours at 185°F, and therefore would not be of permanent value in a cleaning bath. The reversion is slower at lower temperatures. On the other hand, sodium pyrophosphate is less than 1% converted to the ordinary phosphate in 60 days in alkaline solution at 185°F. Sodium tetraphosphate decomposes quite rapidly in "neutral" solution, and presumably is not useful in alkaline baths. Data are also presented on the hydration of these polyphosphates in acid and unbuffered "neutral" solutions.

ERNEST H. LYONS, JR.

Zinc Corrosion and the Application of Protective Coatings to Paper Roofing. By EUGEN DEISS. *Wiss. Abhandl. deut. Materialprufungsanstalt* **2,** No. 2, 46-51 (1941); *Chem. Abstracts* **37,** 4676 (1943). On roofs covered with tar paper or bituminous paint, rain water takes up acids produced in the bituminous substance by weathering, and will attack zinc plated hardware, galvanized gutters, zinc pipes, etc. It is recommended that the roof paint contain so much mineral matter that weathering will not produce acids.

ERNEST H. LYONS, JR.

An Electrochemical Relay. By L. V. NITIKIN. *Zavodskaya Lab.* **9,** 926 (1940); *Khim Referat. Zhur.* **4,** No. 3, 66 (1941). *Chem. Abstracts* **37,** 4308 (1943). A relay is described which automatically shuts off the current when a certain amount has passed, as for depositing a given weight of precious metal, or for automatic charging or discharging of batteries. A horizontal glass tube is suspended from a balance beam with a mercury electrode at each end, and is filled with a coulometer solution. The increase of weight of the cathode by passage of the current displaces the beam so as to break the electrical contact.

ERNEST H. LYONS, JR.

Progress in Composite Metal Plates. By WERNER ENGELHARDT. *Z. Metallkunde* **34,** 12-16 (1942); *Chem. Zentr.* **1942, I,** 2581: *Chem. Abstracts* **37,** 4345. Rolling or deformation of two sheets of different metals is shown experimentally to be unnecessary to secure satisfactory adherence or union of the two metals. It is only necessary to maintain the proper temperature and to secure a perfect contact of the two surfaces. This depends on surface purity, surface relief, and pressure. The bond is established by the entry of the surface atoms of one metal into the atomic structure of the other one, without relinquishment of any bonds already existing (resonance of atomic bonds). This is of importance to electroplating, because the bond between the plate and the basis metal is of the same nature; these experiments indicate that all that is necessary to secure a perfect bond is sufficiently close approach so that the atoms of the one metal can enter the atomic structure of the other. If the metals are clean and sufficiently smooth, this can be done by a little pressure. This is why surfaces to be electroplated must be clean to secure adherence. The author points out that when joining two metals, high temperatures will cause actual diffusion of one metal into the other; with some combinations (as iron-zinc in galvanizing) this must be avoided, because the intermetallic layers are brittle and weak.

ERNEST H. LYONS, JR.

Native Raw Materials and their Advantageous Use in Paints. FRITZ JURGEN PETERS. *Z. wirt. Fertigung* **45,** No. 10, 11-13 (1941); *Chem. Zentr.* **1942, II,** 102.—Alkyd resins, thermosetting phenol resins and chlorinated rubber as paint materials on the basis of their use. Procedures are given for their direct use without admixts. A perfect painting surface is a necessary condition for stability of the paint. Rust should be removed completely from iron by use of rotating steel brushes or sandblasting. The surface of light metals must be roughened or chemically pretreated. The rolled surface of rolled steel sheets should be taken off by sandblasting.

RICHARD G. ROWE, *Chemical Abstracts*

Wrinkle Finishes—What You Should Know. III. The Blackness of Black Wrinkle Finishes. JEFFREY R. STEWART. *Products Finishing* **7,** No. 8, 44, 46, 48, 50, 52 (1943); cf. *C. A.* **37,** 3622[1].—The quant. measurement of the blackness of black wrinkle finishes, the production of wrinkle finishes without tung oil or oiticica oil and the significance of the film thickness of wrinkle finishes are discussed.

LEOPOLD SCHEFLAN, *Chemical Abstracts*

Paints Containing Synthetic Resins. II. III. A. FOULON. *Farbe u.* Lack **1941,** 368, 377, 390, 396; *Chem. Zentr.* **1942, I,** 1687.—A discussion of (1) air-drying alkyd resins and urea resins, (2) esters as solvents, (3) modern methods of prepn., (4) different types and uses of lacquers contg. synthetic resins and (5) patents relating thereto.

G. W. AYRES, *Chemical Abstracts*

Protection Again Fire and Explosion Hazards in Lacquer Plant (Stilling) **24.** Penao, a new source of oil [for manuf. of paints] (Bondar) **27.** Luminescent materials and petroleum industry [paints] (Brennan) **3.** Investigation into effects of continued exposure to vapor of volatile solvents [in paint factory] (Killick) **13.**

Priming Paints. F. KOLKE. *Farben-Chem.* **13,** 47-54 (1942); *Chem. Zentr.* **1942, I,** 3044.—The importance of priming coats, shades, prepn. and properties are discussed.

ANTHONY M. SCHWARTZ, *Chemical Abstracts*

Interior Resin-Oil-Emulsion Paints. A. C. ELM and S. WERTHAN. *Paint Varnish Production Mgr.* **23,** 90-6, 98, 100 (1943); cf. *C. A.* **37,** 2593[6].

G. W. AYRES, *Chemical Abstracts*

Recovery of Paint Overspray. S. DONALD PERLMAN. *Paint Varnish Production Mgr.* **23,** 64-6 (1943); cf. *C. A.* **37,** 2196[9].

G. W. AYRES, *Chemical Abstracts*

Paint Industry in the War. A. I. TOTTEN, JR. *Paint Varnish Production Mgr.* **23,** 59-60, 62 (1943).—An address on (1) raw-material replacements in paints and (2) progress in standardization of testing procedures, in simplification and consolidation of paint specifications, in color standards for protective coatings, in reuse of sludge material and in wood finishing.

G. W. AYRES, *Chemical Abstracts*

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BUFFALO	63	+16½	+26.1
SAN FRANCISCO	34	+ 6½	+19.1
CINCINNATI	55	+ 9	+16.3
GRAND RAPIDS	87	+12	+13.7
PITTSBURGH	55	+ 7½	+13.6
BRIDGEPORT	78	+10½	+13.4
CLEVELAND	105	+13½	+12.8
SPRINGFIELD	70	+ 8½	+12.1
TOLEDO	37	+ 4	+10.8
TORONTO	95	+ 9	+ 9.4
NEWARK	174	+15	+ 8.6
CHICAGO	278	+20½	+ 7.3
BALTIMORE-WASH.	98	+ 6	+ 6.1
MONTREAL	50	+ 2½	+ 5.
NEW YORK	139	+ 7	+ 5.
DETROIT	280	+11½	+ 4.1
PHILADELPHIA	132	+ 5	+ 3.7
WATERBURY	106	+ 3	+ 2.8
MILWAUKEE	93	+ 2½	+ 2.6
INDIANAPOLIS	60	+12½	+ 2.
JACKSON	—	—	—
DAYTON	96	− 1	− 1
BOSTON	117	− 1½	− 1.2
SYRACUSE	46	− 1	− 2.1
ROCHESTER	86	− 3	− 3.4
LOS ANGELES	117	− 4½	− 3.8
LANCASTER	43	− 3	− 6.9
ANDERSON	30	− 3½	−11.6
NEW HAVEN	103	−14	−13.5
PROV.-ATTLEBORO	54	− 8½	−15.7

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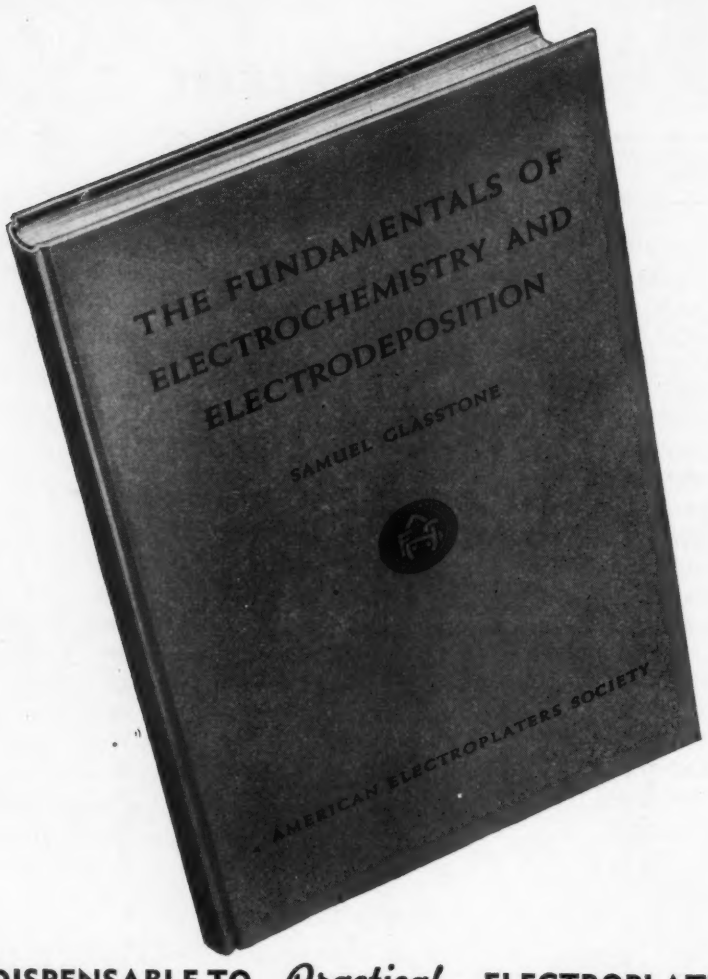
Per Cent of Gain 5.1%	



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BOOK REVIEWS

By

DR. GEORGE DUBPERNELL, *United Chromium, Inc.*

Industrial-Commercial Electrical Reference. E. S. Lincoln, 1300 pages. Electrical Modernization Bureau, New York City. October, 1941. Price $10.00.

This is the first edition of a reference book intended to serve all branches of the electrical industry with facts, tables, and general information necessary for everyday work. It is supplementary to the "Standard Handbook For Electrical Engineers" which was reviewed in February, 1943, and places greater emphasis on the detailed specifications, installation, and use of electrical equipment. It is intended primarily for industrial electricians, and designing and maintenance engineers. However, each section is introduced by an excellent review of some general information and sufficient fundamental facts regarding that particular subject or type of equipment to enable one to understand the operation of the apparatus in question. This general information is so clearly and simply presented with the aid of numerous line drawings, charts, and pictures, that the book should be very helpful in understanding how different types of electrical equipment operate, and can serve as an elementary textbook as well as a guide to electrical machinery and material of all sorts.

This reference book is divided into twenty-six separately paged sections, each section being designated by a letter of the alphabet from A to Z. The subjects covered and the space devoted to each are as follows: Electrified Industry, 10 pages; Electrical Fundamentals and Systems, 8 pages; Industrial Wiring Systems, 264 pages; Switchboards, 32 pages; Panelboards, 13 pages; Electrical Control, 117 pages; Electrical Protective Equipment, 75 pages; Motors and Generators, 86 pages; Power Factor, 20 pages; Industrial Electrical Lighting, 138 pages; Industrial Electrical Heating Equipment, 46 pages; Electric Furnaces, 35 pages; Electrical Welding, 26 pages; Signal, Communication and Alarm Systems, 18 pages; Transformers, 32 pages; Storage Batteries, 41 pages; Electronic Equipment, 36 pages; Electrical Measur-

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An alphabetical index of eighty "Sponsors" or firms who contributed material for the book is given at the end. The Sponsors for the section on Electroplating were the Meaker Company and W. A. Hesse & Company, and the illustrations in this section are mainly of equipment sold by these firms. There is much of general value, nevertheless. The latter firm make portable electroplating outfits for plating objects in situ with a brush instead of immersing in a tank of solution. Pages H-73 to H-78 relate to Electroplating Generators, and the Sponsor associated with this material is the Electric Products Company. Rectifiers are discussed on pages Q-30 to Q-36, and this section in sponsored by the General Electric Company. Only copper oxide rectifiers for electroplating are discussed in detail in addition to Tungar battery chargers.

Each section of the book relating to equipment discusses "Installation" and "Operation." The author states in the Foreword that Installation covers economic factors, selection of equipment, layout, application and control. Operation includes inspection, maintenance, testing, surveys, analysis of performance, operating costs, and correction of faulty operation. The lack of a complete alphabetical index is somewhat rectified by the use of extensive cross-references throughout the text. While the work partakes to some extent of a compilation from manufacturers' catalogs, it is very much more. The information given is practical and understandable, and should be helpful to anyone connected with installing or operating electrical equipment in any way. There is a profusion of illustrations, and tables of technical data. The figures average more than one to a page, many pages having as many as five or ten photographs. The organized tables of data number about 336, but there are innumerable smaller tables not formally labelled as such. Much material is reprinted from the National

Electrical Code (N.E.C.) and National Electrical Manufacturers Association (N.E.M.A.), and other specifications and standards. The most highly advanced technical data does not seem to be included; the intricate and abstruse appears to be avoided and emphasis is placed on making practical information readily available.

The book is well bound and well printed on good grade paper, and is very readable due to extensive use of large modern type. One criticism is that it is too large to hold in the hand and consult, and must be used on a desk or table. It is about 9 x 11½ x 3", and weighs 12 lbs. It is planned to keep the volume up to date by means of a Supplementary Service which is free to purchasers.

• • •

(1) The Fundamentals of Electrochemistry and Electrodeposition, by Samuel Glasstone, 90 pages, $2.00.

(2) Electroplating and Anodizing, by J. Rosslyn, 224 pages, $2.50.

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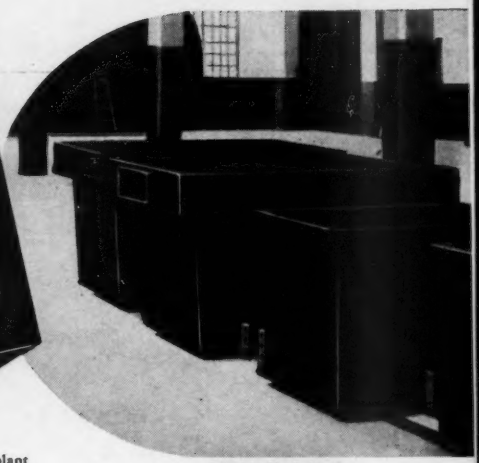

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